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ABSTRACT

As a reflection of the importance attached to successfully educating children whose native language is not English, the U.S. Department of Education's longitudinal study of Chapter 1 assistance, "Prospects," includes a component devoted to the analysis of limited-English-proficient (LEP) students. Chapter 1, renamed Title 1 in 1994, is the primary federal program of assistance for educating disadvantaged students. This report is the second of two focused on the LEP population. A cross-sectional description of LEP students and their educational services during the 1991-1992 school year appears in Puma and Moss (1995). That analysis is extended in this report by examining the background characteristics, educational experiences, and academic outcomes of LEP students during the full 4 years of the "Prospects" study, from the school year ending in 1991 to the school year ending in 1994. A nationally-representative sample of public school students in the 3rd grade in the 1990-1991 academic year, and a separate nationally representative sample of public school students in the first grade in the 1991-92 academic year, are tracked through 1994 (Grades 1 to 6) to document the experience of LEP students and contrast it with that of English proficient students. Chapter 1 focuses on defining the LEP population. Chapter 2 discusses the characteristics of LEP students and their families (ethnicity, language, income, family structure). Chapter 3 focuses on educational services for LEP students, and chapter 4 is concerned with the educational outcomes of LEP students, with specific focus in English proficiency, reading, math, and retention in grade. (Author/VWL)

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Prospects: The Congressionally Mandated Study of Educational Growth and Opportunity

Final Report on Limited English Proficient Students

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TABLE OF CONTENTS

EXECUTIVE SUMMARY i

CHAPTER 1 DEFINING THE LEP POPULATION 1-1
Overview of the Chapter 1-2
Legal Context for Provision of Services to LEP Students 1-4
The LEP Indicator Variables 1-7
Imputation of Missing Data 1-12
Overall LEP Status, by Cohort and Year 1-14
The Relative Importance of Perceptions Versus Services 1-20
The Role of Perceptions and Services in Defining the LEP Population Over Time 1-26
General Trends 1-29
Special Cases 1-30
LEP Transitions 1-33
Types of Transitions 1-34
Entrances into LEP Status 1-37
Exits from LEP Status 1-41
Defining LEP Groups and Comparison Groups for Further Analyses 1-44

CHAPTER 2 THE CHARACTERISTICS OF LEP STUDENTS AND THEIR FAMILIES 2-1
Other Research on LEP Students' Characteristics 2-1
Overview of this Chapter 2-2
The Characteristics of All LEP Students 2-3
Ethnicity and Native Language Characteristics 2-3
Geographic Distribution 2-3
Language Proficiency 2-11
How Do the Resources of Low-Income LEP Students Compare to Those of Low-Income EP Students? 2-22
Economic Resources 2-26
Family Structure 2-32
Parent Involvement and Expectations 2-34
Student Attitudes and Self-Perceptions 2-47
Changing Schools 2-49
School Poverty and LEP Concentration 2-52
Summary 2-58

TABLE OF CONTENTS
(continued)

CHAPTER 3 EDUCATIONAL SERVICES FOR LEP STUDENTS 3-1
Overview of this Chapter 3-2
Interpretation of Weighted Results 3-3
A Brief Comment on Imputation Procedures 3-4
Are Educational Services Responsive to the Special Needs of LEP Students? . . 3-5
Do the schools that LEP students attend run integrated, focused LEP programs well- supported by and coordinated within the school structure as a whole? 3-5
Do LEP students regular classroom teachers and aides have the appropriate training to meet the needs of LEP students? 3-19
Are the instructional services provided in the classroom appropriate to the educational needs of LEP students? 3-27
Do LEP Students at High-Poverty Schools Receive the Same Quality of Educational Inputs as EP Students at High-Poverty Schools? 3-52
Are the regular classroom reading/English/language arts and math teachers of LEP students as educated and experienced as the regular classroom teachers of EP students? 3-53
How does the regular classroom instructional setting for LEP students compare to the regular classroom instructional setting of EP students? 3-58
Do LEP students have the same access to material resources as EP students in the regular reading/English/language arts and math classrooms? 3-66
Do LEP Students Receive the Same Instructional Content as EP Students? 3-70
Summary 3-84

CHAPTER 4 EDUCATIONAL OUTCOMES FOR LEP STUDENTS 4-1
Description of the Outcomes Analyzed 4-2
Sample Definitions and Methodology 4-3
Student Outcomes: English Proficiency 4-5
Student Outcomes: Reading Achievement Test Scores 4-11
Reading Test Scores for All Students 4-12
Reading Test Scores for Low-Income Students 4-16
Student Outcomes: Math Achievement Test Scores 4-18
Math Applications Test Scores 4-21
Math Computation Test Scores 4-23
Math Test Scores for Low-Income Students 4-26
Student Outcomes: Retention in Grade 4-30
Parents' Reports of Retention 4-30
Retention Based on Observed Grade Sequence 4-33
Retention Rates for Low-Income Students 4-35
Summary 4-35

TABLE OF CONTENTS
(continued)

POSTSCRIPT

REFERENCES

APPENDIX A Procedures for Imputing LEP Status When Data on Individual Indicators Are Missing

APPENDIX B *Prospects* Study Design

APPENDIX C Missing Data Rates for Variables Used to Identify LEP Students

APPENDIX D Treatment of Missing Data

APPENDIX E Procedures for Calculating Composite Scores for Instructional Emphasis

APPENDIX F Sample Sizes for Outcomes Analyses

APPENDIX G Structure of HLM Analysis for Achievement Test Scores

APPENDIX H Parameter Estimates for HLM Analysis of Math Test Scores

APPENDIX I Teacher Judgements as Measures of Students' English Proficiency

LIST OF EXHIBITS

CHAPTER 1

Exhibit 1.1 *Prospects* 1st and 3rd Grade Cohort Data Collection Points for This Report . . . 1-10
Exhibit 1.2 Percent of Sample and National Population of Public School Students Identified as LEP Based on Indicator Variables in *Prospects* Data, by Cohort and Year . . . 1-15
Exhibit 1.3 Longitudinal Patterns of Inclusion in the LEP Group, by Cohort . . . 1-18
Exhibit 1.4 Percent of LEP Students Perceived versus Served as Limited-English Proficient at Any Point During the Follow-Up Period, by Cohort . . . 1-22
Exhibit 1.5 Contribution of Individual Criteria to the LEP Population During the Follow-Up Period: 1st Grade Cohort . . . 1-24
Exhibit 1.6 Contribution of Individual Criteria to the LEP Population During the Follow-Up Period: 3rd Grade Cohort . . . 1-25
Exhibit 1.7 Percent of LEP Students Perceived versus Served as Limited-English Proficient, by Year: 1st Grade Cohort . . . 1-27
Exhibit 1.8 Percent of LEP Students Perceived versus Served as Limited-English Proficient, by Year: 3rd Grade Cohort . . . 1-28
Exhibit 1.9 Transition Patterns Among LEP Students, by Cohort . . . 1-35
Exhibit 1.10 Criteria Associated with Entrances into LEP Status, by Cohort and Year . . . 1-40
Exhibit 1.11 Criteria Associated with Exits from LEP Status, by Cohort and Year . . . 1-42
Exhibit 1.12 Population Shares and Maximum Sample Sizes for LEP Subgroups, by Cohort . . . 1-46

CHAPTER 2

Exhibit 2.1 Race/Ethnicity of LEP and All Other Students . . . 2-4
Exhibit 2.2 Native Language for All LEP Students . . . 2-5
Exhibit 2.3 Regional Distribution of LEP and All Other Students . . . 2-7
Exhibit 2.4 Race/Ethnicity of All LEP Students by Region . . . 2-8
Exhibit 2.5 Distribution of LEP Students by State, for States With Largest Share of LEP Students in Sample, Unweighted . . . 2-9
Exhibit 2.6 Urbanicity of LEP and All Other Students . . . 2-10
Exhibit 2.7 Teacher Assessments of Native Language Proficiency for All LEP Students . . . 2-13

LIST OF EXHIBITS
(continued)

CHAPTER 2 (continued)

Exhibit 2.8 Teacher Assessments of Native Language Proficiency of LEP Students, By Race/Ethnicity 2-15
Exhibit 2.9 Teacher Assessments of English Language Proficiency for All LEP Students 2-16
Exhibit 2.10 Teacher Assessments of English Language Proficiency of LEP Students, By Race/Ethnicity 2-18
Exhibit 2.11 Teacher Assessments of LEP Students' English Language Proficiency, by Native Language Proficiency 2-20
Exhibit 2.12 Self-Reported English Language Proficiency for Parents of LEP Students 2-21
Exhibit 2.13 Frequency With Which English is Spoken At Home 2-23
Exhibit 2.14 Teacher Assessments of Students' English Proficiency, by Parents' Assessments Of Their Own English Proficiency 2-24
Exhibit 2.15 Teacher Assessments of Students' Native Language Proficiency, by Parents' Assessments of Their Own English Proficiency 2-25
Exhibit 2.16 Income Distribution for Low-Income LEP and Low-Income EP Families 2-28
Exhibit 2.17 Educational Attainment of Parents of Low-Income LEP and EP Students 2-30
Exhibit 2.18 Employment Status of Parents of Low-Income LEP, Low-Income EP, and Non-Low-Income Students 2-31
Exhibit 2.19 Occupational Status of Parents of Low-Income LEP, Low-Income EP, and Non-Low-Income Students 2-33
Exhibit 2.20 Percent of Low-Income LEP, Low-Income EP, and Non-Low-Income Students in Two-Parent Households 2-35
Exhibit 2.21 Family Size of Low-Income LEP, Low-Income EP, and Non-Low-Income Students 2-36
Exhibit 2.22 Average Frequency of Parents' Participation in Academic Activities with Their Children, for Parents of Low-Income LEP, Low-Income EP, and Non-Low-Income Students 2-38
Exhibit 2.23 Average Frequency of Parents' Participation in Activities at Their Children's School, for Parents of Low-Income LEP, Low-Income EP, and Non-Low-Income Students 2-39
Exhibit 2.24 Time Spent At Home After School With No Adult Present: Low-Income LEP, Low-Income EP, and Non-Low-Income Students 2-40
Exhibit 2.25 Average Frequency With Which Parents Say They Disagree With Their Children About Discipline or Family Rules, for Parents of Low-Income LEP, Low-Income EP, and Non-Low-Income Students 2-42

LIST OF EXHIBITS
(continued)

CHAPTER 2 (continued)

Exhibit 2.26 Average Frequency With Which Parents Say They Talk With Their Child About Expectations for School Performance, for Parents of Low-Income LEP, Low-Income EP, and Non-Low-Income Students 2-43

Exhibit 2.27 Average Frequency With Which Parents Say They Talk With Their Child About Future Plans and Goals, for Parents of Low-Income LEP, Low-Income EP, and Non-Low-Income Students 2-44

Exhibit 2.28 Parents' Expectations of Their Children's Educational Attainment, for Parents of Low-Income LEP, Low-Income EP, and Non-Low-Income Students 2-46

Exhibit 2.29 Student Attitudes About School, for Low-Income LEP, Low-Income EP, and Non-Low-Income Students 2-48

Exhibit 2.30 Students' Self-Perceptions, for Low-Income LEP, Low-Income EP, and Non-Low-Income Students 2-50

Exhibit 2.31 Number of Times Students Changed Schools Within The Study Period, for Low-Income LEP, Low-Income EP, and Non-Low-Income Students 2-51

Exhibit 2.32 Attendance of High Poverty Schools and School LEP Concentration, for LEP and All Other Students 2-53

Exhibit 2.33 The Relationship Between School Poverty and School LEP Concentration 2-55

Exhibit 2.34 Percentage of Low-Income LEP and EP Students Attending High-Poverty Schools 2-56

Exhibit 2.35 Percentage of LEP Students Attending High Poverty Schools, by Race/Ethnicity 2-57

CHAPTER 3

Exhibit 3.1 Percent of LEP Students Attending Schools that Offer Specific Instructional Services to Meet the Needs of LEP Students, by Cohort 3-8

Exhibit 3.2 Percent of LEP Students Attending Schools with Principals Who have Specialized Training to Meet the Needs of LEP Students, by Cohort 3-10

Exhibit 3.3 Frequency that LEP Students Attend Schools that Rely on Specific Procedures to Coordinate Instruction Between ESL/BE and Regular Instructional Staff, by Cohort 3-12

LIST OF EXHIBITS
(continued)

CHAPTER 3 (continued)

Exhibit 3.4 Percent of LEP Students Attending Schools that Integrate LEP and EP Students for Academic or Non-Academic Instruction, by Cohort 3-14

Exhibit 3.5 Percent of LEP Students Attending Schools that Offer Specific Services to Parents or Families of LEP Students, by Cohort 3-16

Exhibit 3.6 Parents' Report of Whether They and Their Children are Respected by School Staff, by Cohort and Students' English Proficiency 3-18

Exhibit 3.7 Percent of LEP Students With Regular Reading/English/Language Arts Teachers Who are Certified in English-as-a-Second Language and/or Bilingual Education, by Grade and Cohort 3-21

Exhibit 3.8 Percent of LEP Students With Regular Math Teachers Who are Certified in English-as-a-Second Language and/or Bilingual Education, by Grade and Cohort 3-22

Exhibit 3.9 Percent of LEP Students With Regular Reading/English/Language Arts Teachers and Aides Who Report Proficiency in the Predominant LM-LEP Non-English Language of the Class, by Grade and Cohort 3-25

Exhibit 3.10 Percent of LEP Students With Regular Math Teachers and Aides Who Report Proficiency in the Predominant LM-LEP Non-English Language of the Class, by Grade and Cohort 3-26

Exhibit 3.11 Percent of LEP Students Receiving ESL/BE Instructional Services, by Source of Funding, Grade, and Cohort 3-29

Exhibit 3.12 Percent of LEP Students Receiving ESL/Bilingual Instructional Services by Prior Year Teachers' Rating of Students' English Understanding and Writing Proficiency 3-32

Exhibit 3.13 Percent of LEP Students Who Received ESL/BE Instructional Services in 1992-1993, and/or 1993-1994 Academic Years by Teacher Rating of Students' English Proficiency in the Spring of 1992: 1st Grade Cohort 3-35

Exhibit 3.14 Percent of LEP Students Who Received ESL/BE Instructional Services in 1992-1993, and/or 1993-1994 Academic Years by Teacher Rating of Students' English Proficiency in the Spring of 1992: 3rd Grade Cohort 3-36

Exhibit 3.15 Percent of LEP Students' Regular Classroom Instruction in a Language Other than English, by Subject, Grade, and Cohort 3-39

Exhibit 3.16 Percent of LEP Students' Regular Reading/English/Language Arts Classroom Instruction in a Language Other than English by Prior Year Teacher Ratings of LEP Students' English Understanding and Writing Proficiency 3-41

LIST OF EXHIBITS
(continued)

CHAPTER 3 (continued)

Exhibit 3.17 Percent of LEP Students Receiving Supplementary Instruction in Reading/English/Language Arts, by Source of Funding, Grade, and Cohort 3-44
Exhibit 3.18 Percent of LEP Students Participating in Supplementary Instruction in Math, by Source of Funding, Grade, and Cohort 3-45
Exhibit 3.19 Emphasis on Reading Attitudes by LEP Students' Regular Reading/English/Language Arts Teachers in Spring 1992, by Spring 1991 Teacher Ratings of Students' English and Native Language Reading Proficiency, 4th Grade 3-49
Exhibit 3.20 Emphasis on Reading Comprehension by LEP Students' Regular Reading or English/Language Arts Teachers in Spring 1992, by Spring 1991 Teacher Rating of Students' English and Native Language Reading Proficiency, 4th Grade 3-50
Exhibit 3.21 Emphasis on Writing Attitudes/Skills by LEP Students' Regular Reading/English/Language Arts Teachers in Spring 1992, by Spring 1991 Teacher Rating of Students' English and Native Language Writing Proficiency, 4th Grade 3-51
Exhibit 3.22 Educational Attainment of Students' Regular Reading/English/ Language Arts Teachers in the Spring of 1994, by Cohort, School Poverty, and Students' English Proficiency 3-54
Exhibit 3.23 Educational Attainment of Students' Regular Math Teachers in the Spring of 1994, by Cohort, School Poverty, and Students' English Proficiency 3-55
Exhibit 3.24 Educational Attainment of Students' Regular Reading/English/ Language Arts Classroom Aides in the Spring of 1994, by Cohort, School Poverty, and Students' English Proficiency 3-56
Exhibit 3.25 Educational Attainment of Students' Regular Math Classroom Aides in the Spring of 1994, by Cohort, School Poverty, and Students' English Proficiency 3-57
Exhibit 3.26 Teaching Experience of Students' Regular Reading/English/ Language Arts Teachers in the Spring of 1994, by Cohort, School Poverty, and Students' English Proficiency 3-59
Exhibit 3.27 Teaching Experience of Students' Regular Math Teachers in the Spring of 1994, by Cohort, School Poverty, and Students' English Proficiency 3-60
Exhibit 3.28 Percent of Students' Regular Reading/English/Language and Math Teachers in the Spring of 1994 Who Have a Permanent, Standard Teaching Certificate in the State that They Teach, by Cohort, School Poverty, and Students' English Proficiency 3-61

LIST OF EXHIBITS
(continued)

CHAPTER 3 (continued)

Exhibit 3.29 Average and Distribution of Reading/English/Language Arts Class Size for Students in the Spring of 1994, by Cohort, School Poverty, and Students' English Proficiency 3-62
Exhibit 3.30 Average and Distribution of Math Class Size for Students in the Spring of 1994, by Cohort, School Poverty, and Students' English Proficiency 3-63
Exhibit 3.31 Percent of Students that are Enrolled in Reading/English/Language Arts and Math Classes Based on Ability in the Spring of 1994, by Cohort, School Poverty, and Students' English Proficiency 3-65
Exhibit 3.32 Percent of Students With Reading/English/Language Arts and Math Teachers that Report Having Sufficient Materials to Meet Most Students' Needs in 1994, by Cohort, School Poverty, and Students' English Proficiency 3-67
Exhibit 3.33 Availability of Computer Hardware and Software in Students' Regular Reading/English/Language Arts Class in 1994, by Cohort, School Poverty, and Students' English Proficiency 3-68
Exhibit 3.34 Availability of Computer Hardware and Software in Students' Regular Math Class in 1994, by Cohort, School Poverty, and Students' English Proficiency 3-69
Exhibit 3.35 Emphasis on Remedial-Typical Skills by LEP Students' Regular Reading/English/Language Arts Teachers in Spring 1994, by Cohort, School Poverty, and Students' English Language Proficiency 3-72
Exhibit 3.36 Emphasis on Applied Skills by LEP Students' Regular Reading/English/Language Arts Teachers in Spring 1994, by Cohort, School Poverty, and Students' English Language Proficiency 3-73
Exhibit 3.37 Emphasis on Writing Attitudes/Skills by LEP Students' Regular Reading/English/Language Arts Teachers in Spring 1994, by Cohort, School Poverty, and Students' English Language Proficiency 3-74
Exhibit 3.38 Emphasis on Communication-Integration Skills by LEP Students' Regular Reading or English/Language Arts Teachers in Spring 1994, by Cohort, School Poverty, and Students' English Language Proficiency 3-75
Exhibit 3.39 Emphasis on Reading Comprehension by LEP Students' Regular Reading or English/Language Arts Teachers in Spring 1994, by Cohort, School Poverty, and Students' English Language Proficiency 3-76

LIST OF EXHIBITS
(continued)

CHAPTER 3 (continued)

Exhibit 3.40 Emphasis on Math Attitudes by Students' Regular Math Teachers in Spring 1994, by School Poverty and Students' English Language Proficiency Status, 6th Grade 3-78
Exhibit 3.41 Emphasis on Remedial-Typical Skills by LEP Students' Regular Math Teachers in Spring 1994, by Cohort, School Poverty, and Students' English Language Proficiency 3-79
Exhibit 3.42 Emphasis on Advanced Math by LEP Students' Regular Math Teachers in Spring 1994, by Cohort, School Poverty, and Students' English Language Proficiency 3-80
Exhibit 3.43 Emphasis on Higher Order Thinking Skills by LEP Students' Regular Math Teachers in Spring 1994, by Cohort, School Poverty, and Students' English Language Proficiency 3-81
Exhibit 3.44 Type of Instructional Materials Used by LEP Students' Regular Reading/English/Language Arts Teachers for LM-LEP Students Compared to Instructional Materials Used for EP Students in Spring 1994, by Cohort 3-83
Exhibit 3.45 Type of Instructional Materials Used by LEP Students' Math Teachers for LM-LEP Students Compared to Instructional Materials Used for EP Students in Spring 1994, by Cohort 3-85
Exhibit 3.46 Frequency of Computer Use in Regular Reading/English/Language Arts Classes in 1994, by Cohort, School Poverty, and Students' English Language Proficiency 3-86
Exhibit 3.47 Frequency of Computer Use in Regular Math Classes in 1994, by Cohort, School Poverty, and Students' English Language Proficiency 3-87

CHAPTER 4

Exhibit 4.1 Teacher Ratings of Students' English Proficiency, 1st Grade Cohort 4-7
Exhibit 4.2 Teacher Ratings of Students' English Proficiency, 3rd Grade Cohort 4-8
Exhibit 4.3 Growth in Teacher-Assessed English Proficiency by Domain, for Students Who are LEP in All Years 4-10
Exhibit 4.4 Reading Comprehension and Vocabulary Subtest Mean Scores for LEP Exiters, LEP Non-Exiters, and EP Students, 1st Grade Cohort 4-13

LIST OF EXHIBITS
(continued)

CHAPTER 4 (continued)

Exhibit 4.5 Reading Comprehension and Vocabulary Subtest Mean Scores for LEP Exiters, LEP Non-Exiters, and EP Students, 3rd Grade Cohort 4-15
Exhibit 4.6 Reading Comprehension and Vocabulary Subtest Mean Scores for LEP Exiters, LEP Non-Exiters, and EP Students, Low Income Students, 1st Grade Cohort 4-17
Exhibit 4.7 Reading Comprehension and Vocabulary Subtest Mean Scores for LEP Exiters, LEP Non-Exiters, and EP Students, Low Income Students, 3rd Grade Cohort 4-19
Exhibit 4.8 Math Applications Subtest: HLM Predicted Scores for LEP Exiters, LEP Non-Exiters, and EP Students, 1st Grade Cohort 4-22
Exhibit 4.9 Math Applications Subtest: HLM Predicted Scores for LEP Exiters, LEP Non-Exiters, and EP Students, 3rd Grade Cohort 4-24
Exhibit 4.10 Math Computations Subtest: HLM Predicted Scores for LEP Exiters, LEP Non-Exiters, and EP Students, 1st Grade Cohort 4-25
Exhibit 4.11 Math Computations Subtest: HLM Predicted Scores for LEP Exiters, LEP Non-Exiters, and EP Students, 3rd Grade Cohort 4-27
Exhibit 4.12 Math Applications Subtest: HLM Predicted Scores for LEP Exiters, LEP Non-Exiters, and EP Students, Low Income Students, 1st Grade Cohort 4-28
Exhibit 4.13 Math Applications Subtest: HLM Predicted Scores for LEP Exiters, LEP Non-Exiters, and EP Students, Low Income Students, 3rd Grade Cohort 4-29
Exhibit 4.14 Math Computations Subtest: HLM Predicted Scores for LEP Exiters, LEP Non-Exiters, and EP Students, Low Income Students, 1st Grade Cohort 4-31
Exhibit 4.15 Math Computations Subtest: HLM Predicted Scores for LEP Exiters, LEP Non-Exiters, and EP Students, Low Income Students, 3rd Grade Cohort 4-32
Exhibit 4.16 Distribution of Grade Progression Patterns for LEP and EP Students 4-34
Exhibit 4.17 Distribution of Grade Progression Patterns for Low-Income LEP and Low-Income EP Students 4-36

LIST OF EXHIBITS
(continued)

APPENDIX B

Exhibit B.1 *Prospects* Primary Sampling Strata B-3
Exhibit B.2 *Prospects* Instruments by Survey Year and Cohort B-9
Exhibit B.3 *Prospects* Data Collection Points by Study Cohort B-10

APPENDIX C

Exhibit C.1 Percent of Students in Population with Missing Data on Individual LEP Components and the Overall LEP Indicator, by Cohort and Year C-1

APPENDIX E

Exhibit E.1 Factor Analysis for Reading/English/Language Arts Instructional Emphasis, 3rd Grade Cohort, 1992 . . . . E-2
Exhibit E.2 Factor Analysis for Reading/English/Language Arts Instructional Emphasis, 1st Grade Cohort, 1994 . . . . E-4
Exhibit E.3 Factor Analysis for Reading/English/Language Arts Instructional Emphasis, 3rd Grade Cohort, 1994 . . . . E-6
Exhibit E.4 Factor Analysis for Math Instructional Emphasis, 1st Grade Cohort, 1994 . . . . E-8
Exhibit E.5 Factor Analysis for Math Instructional Emphasis, 3rd Grade Cohort, 1994 . . . . E-9

APPENDIX F

Exhibit F.1 Unweighted and Weighted Sample Sizes for Analysis of Outcomes F-1
Exhibit F.2 CTBS and SABE Test Status for LEP and All Other Students F-2
Exhibit F.3 Number of Tests Taken for *Prospects* Study, for LEP and All Other Students F-3
Exhibit F.4 CTBS and SABE Test Status for LEP Exiters, LEP Non-Exiters, and EP Students F-4

LIST OF EXHIBITS
(continued)

APPENDIX H

Exhibit H.1 First Grade Cohort Math Computations Parameter Estimates H-1
Exhibit H.2 Third Grade Cohort Math Computations Parameter Estimates H-2
Exhibit H.3 First Grade Cohort Math Applications Parameter Estimates H-4
Exhibit H.4 Third Grade Cohort Math Applications Parameter Estimates H-5
Exhibit H.5 First Grade Cohort Low Income Sample Math Computations Parameter Estimates H-7
Exhibit H.6 Third Grade Cohort Low Income Sample Math Computations Parameter Estimates H-8
Exhibit H.7 First Grade Cohort Low Income Sample Math Applications Parameter Estimates H-10
Exhibit H.8 Third Grade Cohort Math Computations Parameter Estimates H-11

APPENDIX I

Exhibit I.1 The Effect of Imputation on Teacher Assessments of English Language Proficiency I-4
Exhibit I.2 Predictive Power of Prior Years' Values of Teacher Assessed English Language Proficiency I-6
Exhibit I.3 CTBS Reading Vocabulary Scores by English Proficiency: 1st Grade Cohort I-8
Exhibit I.4 CTBS Reading Vocabulary Scores by English Proficiency: 3rd Grade Cohort I-9

EXECUTIVE SUMMARY

Children with limited English proficiency make up an important and growing share of the students in U.S. public schools. These students—many of them foreign-born or the children of recent immigrants with limited English proficiency—are expected to acquire the skills and knowledge that define the public school curriculum while at the same time mastering English as a second language. The challenge this poses to both students and schools has led to a number of educational responses (e.g., the spread of bilingual education and English-as-a-second language instructional practices, federal Title VII funding for supplemental language instruction) and a good deal of research. It has also led to a number of legal battles, often involving the interpretation of Title VI of the 1964 Civil Rights Act, which prohibits discrimination on the basis of national origin. In the most prominent case, *Lau v. Nichols* (1974), the Supreme Court ruled that Title VI entitled LEP students to special language-related services to ensure effective access to education.

As a reflection of the importance attached to successfully educating children whose native language is not English, the U.S. Department of Education's longitudinal study of Chapter 1 assistance, *Prospects*, includes a component devoted to the analysis of limited English proficient (LEP) students. Chapter 1, renamed Title I in 1994, is the primary federal program of assistance for educating disadvantaged students. The current report is the second of two focused on the LEP population. A cross-sectional description of LEP students and their educational services during the 1991-1992 school year appears in Puma and Moss (1995). That analysis is extended here by examining the background characteristics, educational experiences, and academic outcomes of LEP students during the full four years of the *Prospects* study, from the school year ending in 1991 to the school year ending in 1994. A nationally-representative sample of public school students in the 3rd grade in the 1990-91 academic year, and a separate nationally representative sample of public school students in the 1st grade in the 1991-92 academic year, are tracked through 1994 (grades 1 to 6) to document the experience of LEP students and contrast it with that of English proficient students.

DEFINING THE LEP POPULATION

There are no universally recognized standards for what level of proficiency constitutes "limited English proficiency"; each state or sometimes even each school district within a state has its own definition and procedures for identifying LEP students.[1] For this reason, a broad definition of the LEP population is adopted for this report based on eight indicator variables in the *Prospects* data. All students who meet any of the eight criteria at any point during the observation period are placed in the overall LEP sample for our analysis. This broad-based operationalization of LEP status was selected to avoid the risks of undercounting the number of limited English proficient students in our nation's schools.[2]

An alternative approach to identifying LEP students would have been to collect comprehensive data for determining students' level of proficiency in English. Due to resource constraints this was not possible. However, some basic information on proficiency is available from a variety of sources.

Three of the eight criteria used to identify LEP students concern *perceptions by school staff* that a student has limited English proficiency:

- Did the student's primary teacher consider him or her to have limited English proficiency?
- Did the school choose to test the student in Spanish rather than English because of the student's limited English proficiency when *Prospects* administered a standardized achievement test?
- Did the school consider the student unsuitable for testing in either English or Spanish because of the student was not proficient enough in either of these languages when *Prospects* administered a standardized achievement test?

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[1] Although there is no single definition of LEP, there are several definitions used widely—for example, the Title VII definition and the definition in a 1970 memorandum from the Office of Civil Rights in the U.S. Department of Health, Education, and Welfare. This memorandum is discussed further in Chapter 1 of this report.

[2] The approach used in this study to identify LEP students was developed at the request of OBEMLA and with input from outside experts.

Another five criteria focus on the *receipt of language-related services* normally reserved for students who have limited English proficiency. These criteria ask whether the student was:

- Reported by her/his primary teacher as receiving English-as-a-Second language (ESL) instruction due to limited English proficiency;
- Reported by her/his primary teacher as receiving bilingual instruction due to limited English proficiency ;
- Reported by her/his primary teacher as having received special services of an unspecified type due to limited English proficiency;
- Listed in school records as receiving ESL or bilingual education instruction while other sources of information indicate this is due to limited English proficiency; and/or
- Associated with a specific ESL and/or bilingual education teacher, other than the regular or Chapter 1 teacher, for purposes of *Prospects* data collection.

The LEP students identified by *any* of these eight criteria during any of the three or four years of data collection constitute 9 percent of all students attending public elementary schools. In any one year, 5.6 to 7.6 percent of public school students meet one or more of the criteria, a share that declines steadily between the 1st and 6th grades as students gain greater English language skills. Despite this trend, most students categorized as LEP at some point during the follow-up period are categorized as LEP by one or more of these measures in *all* years with available data.

Use of this broad-based indicator includes some risk of creating a circular definition in which a student receiving services under local school procedures would be included whether or not the student is limited English proficient. However, analysis in the course of this report, including the high proportion of students identified as LEP by multiple measures, indicates that the findings are robust in the face of such potential overcounts. Since students are also identified with no regard to services, the net effect may be an overcount or undercount.

Several other aspects of the origins and dynamics of LEP status should be noted:

- The most prevalent LEP indicators were receipt of ESL or bilingual education instruction and teacher's identification of a student as LEP. More than two-thirds of LEP students met each of these two criteria at some point during the observation period.

- In any year, from 4.5 to 8.5 percent of the students in the LEP population were perceived by teachers or administrators as having limited English proficiency but did not receive any LEP-related services. It is unclear how much of this pattern is due to potential limitations in the classification variables and how much is a real absence of needed assistance.

- In any year, from 15 to 23 percent of the students meeting one of our eight criteria for identifying students as LEP received ESL, bilingual, or other special language-related services but were not identified by surveyed teachers or administrators as having limited English proficiency. Perceptions of whether the student was LEP were based on the teacher's response to a question of whether the student is LEP and school staff's decision whether the student could be meaningfully tested using a standardized achievement test in English. It is unclear how much of this pattern is due to potential limitations in the classification variables and how much is a real mis-targeting of support services.

- Between 13 and 15 percent of LEP students in each elementary school grade move from a classification of "LEP" to a classification of "not LEP" by the following year. Since there are more LEP students in earlier grades, this translates into 1.1 percent of public school students exiting LEP status when moving from 1st to 2nd grade (about 41,000 students) and 0.8 percent of all public school students making this transition when moving from 5th to 6th grade (about 23,000 students) using our criteria for identifying students as LEP. This suggests an important amount of progress in addressing the English language needs of non-native English speaking students. The great majority of these students never return to the LEP group during the study period.

- Less than one percent of all public school students move from a classification of "not LEP" to a classification of "LEP" each year. Most of these entrances are transitory, as the great majority of students who entered LEP status during the study period left it again by the end of the study period.

- Overall there are growing levels of English proficiency for LEP students: about 30 percent of the students categorized as LEP at some point during the observation period are no longer classified as LEP at the end of data collection.

CHARACTERISTICS OF LEP STUDENTS AND THEIR FAMILIES

On many measures of family resources and attributes, LEP students are clearly disadvantaged *even compared to other low-income students.* Compared to other students in low-income families, LEP students tend to: be in families with lower incomes; be more likely to attend high-poverty schools; and change schools more often. Further, compared to other low-income parents, LEP students' parents have much less education. On the other hand, poor LEP students are more likely than other poor students to be in two-parent households. On balance, however, the relative disadvantages faced by LEP students suggest that, to the extent that the goal of federal educational policy and resources is to help "level the playing field" for all groups of students, an argument can be made to target resources toward LEP students.

Specific findings on the disadvantages of LEP students include the following:

- LEP students are much more likely than other public school students to attend high-poverty schools, and tend to be concentrated in particular schools. About three-fourths of all LEP students attend high-poverty schools. In contrast, only about one-third of English proficient (EP) students attend high-poverty schools.

- LEP students attend schools where the average LEP concentration is about 25 percent; in contrast, EP students attend schools where the average LEP concentration is less than 5 percent. There is also a very strong relationship between school LEP concentration and school poverty. Of schools with LEP concentrations above 25 percent, almost all are high-poverty schools.

- Compared to parents of low-income English proficient students, parents of low-income LEP students on average have *much* lower levels of education. Less than 40 percent of parents of low-income LEP students have a high school education, compared to about 75 percent of parents of low-income EP students.

- More than 40 percent of LEP students' parents report a poor command of English. Further, more than 60 percent of LEP students' parents say that a language other than English is spoken in their home most of the time. These students must therefore rely heavily on schools for help in learning English.

- Parents of low-income LEP students are less likely than parents of low-income EP students and parents of higher-income students to participate in activities at their children's school, perhaps because of language barriers or cultural differences.

- Low-income LEP students change schools more often than low-income EP students and higher-income students.

At the same time, there are at least two positive background indicators for LEP students compared to other low-income students. These are:

- Low-income LEP students are more likely than low-income EP students to come from two-parent households.

- Parents of low-income LEP students are more likely than parents of other low-income students to talk to their child at least once a week about future plans and goals.

The *Prospects* study does not include an independent assessment of the student's proficiency in English. As a result, this report relies heavily on teacher judgements of student proficiency. The survey instrument did not require teachers to respond to this question for every student, and the specific question asking about a student's proficiency does not specify the context (e.g., "as compared to other students in your class").

The analysis in this report indicates that the teacher judgements of proficiency provide a valid measure of student proficiency. However, given the dependence of this measure on survey data, as detailed in this report, there is likely to be some slippage between the teacher report and the child's actual level of proficiency at both absolute and relative levels. While due to cost and other factors, such constraints are not uncommon in large scale studies, the data should be interpreted with the nature of the measurement kept in mind.

EDUCATIONAL SERVICES FOR LEP STUDENTS

Three overarching research questions arise concerning the educational services received by limited English proficient students:

(1) Are educational services responsive to the special needs of LEP students?

(2) Do LEP students receive the same quality of educational inputs as EP students? and

(3) Do LEP students receive the same level of instructional content as EP students?

Educational services, along with the home resources of LEP students summarized above, have a major influence on the educational outcomes of LEP students.

Are educational services responsive to the special needs of LEP Students?

Several school-wide measures of support at the schools LEP students attend are encouraging:

- ESL/BE instructional programs are available in students' grade level at 83 to 91 percent of LEP students' schools;
- Around 60 percent of LEP students' principals have received training in the education of limited English proficient students within the past three years;
- Over three-fourths of LEP students' schools have a policy to integrate LEP and EP students for academic subjects, and 95 percent integrate LEP and EP students during non-instructional times; and
- Over 90 percent of LEP students' schools provide translation in at least one language other than English for parent/school meetings.

These figures represent an important beginning for a public school system that seeks to support and nurture all students with limited English proficiency. However, these indicators do not tell us how many of the LEP students in a particular school benefit from the favorable practices known to exist somewhere in the school.

A substantial proportion of LEP students' teachers and classroom aides have qualifications that indicate special training for instructing LEP students, but there appears to be ample room for increasing the training of LEP students' teachers:

- About one-third to one-half of LEP students' regular teachers have a background or training indicating understanding and skills in teaching LEP students, as measured by certification in ESL and/or BE instruction or self-reported proficiency in the predominant non-English language of LM-LEP students in their classrooms.

- Of the LEP students with classroom aides, about four-fifths have an aide proficient in the predominant non-English language of the LM-LEP students in their class.

Most students identified as being limited English proficient are provided English-as-a-second language or bilingual education instruction. Furthermore, consistent with the findings discussed above that LEP students tend to attend high-poverty schools, about half participate in supplementary math and reading/English/language arts instruction:

- Between 80 and 90 percent of the students identified as limited English proficient in a particular year participated in an ESL and/or bilingual instructional program that year.
- The lower a teacher's assessment of a LEP student's English proficiency in the first year, the more subsequent years of ESL/bilingual instructional services that the student is likely to receive. For example, 67 percent of LEP students who are rated as having poor or no English understanding proficiency in the 3rd grade (1990-91 year) receive ESL/bilingual instructional services the following three years, whereas only 10 percent of LEP students rated as having excellent English understanding proficiency receive these services the following three years. In other words, a perceived need for language assistance in the first year of our study is highly correlated with receipt of special language-related services in subsequent years.
- In addition, an average of about 50 percent of LEP students participated in supplementary instruction in reading/English/language arts, while a slightly lower proportion participated in supplementary math instruction.

The Chapter 1 program is the primary source of funding for both supplemental math and reading/English/language arts instruction, and a substantial source of funding for ESL/BE instructional services.

Do LEP students receive the same quality of educational inputs as EP students?

This study addresses many quantifiable measures relating to the qualifications of instructors, type of instruction, materials used in instruction, and the setting in which instruction is provided. However, issues related to the quality of the *actual instruction* provided to limited English proficient students remain an important area for future evaluation.

- LEP and EP students from high-poverty schools have regular classroom teachers with similar teaching qualifications, as measured by their educational attainment and acquisition of permanent teaching certificates. However, LEP students' teachers are somewhat less experienced: more have fewer than ten years of experience, and more are in their first year of teaching.

- Even after controlling for the high-poverty status of a school, LEP students on average are in larger classes than their EP counterparts. However, the average class size for LEP students can be misleading because LEP students are more likely than EP students to be in larger classes and smaller classes.

- LEP students are also more likely than EP students to be grouped in reading/English/ language arts classes based on ability, which based on the nature of instruction and its relation to the broader school could be either detrimental to their progress (if it results in lower expectations) or beneficial in meeting their particular English language instruction needs.

- Based on measures of the availability of instructional materials, LEP and EP students in high-poverty schools appear to have similar physical resources available to their classroom teachers, although LEP students do appear to be in classes with slightly better access to computers.

Do LEP students receive the same level of instructional content as EP students?

The skills emphasized by LEP and EP students' regular reading/English/language arts teachers are similar. To the extent that this measure accurately describes the curriculum taught to LEP students, this is an encouraging finding that indicates LEP students' limited English language proficiency may not be seriously constraining the content taught to them. One exception to this generalization is that LEP students in the 3rd grade in 1994 were *more* likely to have teachers who placed moderate rather than major emphasis on reading skills. A second exception is that LEP students' 6th grade teachers were *more* likely to place major emphasis on writing proficiency skills than EP students' teachers. This may indicate that by the 6th grade, LEP students are ready for basic writing instruction and yet more in need of those skills than their EP peers.

The instructional emphasis of LEP and EP students' math teachers is also similar within high-poverty schools, with the exception that EP students' math teachers place somewhat more emphasis on basic math skills than LEP students' teachers.

Finally, in 1994, four out of every five 3rd grade LEP students were in regular math and reading classes where teachers used the same English and non-English instructional materials for both EP and LEP students. This share increased to nine out of every ten 6th grade LEP students in that year.

FINDINGS RELATED TO EDUCATIONAL OUTCOMES FOR LEP STUDENTS

Overall, the evidence on educational outcomes, in light of the earlier evidence on the initial disadvantages faced by LEP students relative to English proficient students, suggests that LEP students and their schools are able to overcome many obstacles to educational progress. At the same time, it is important to keep in mind that the comparison group here is other *low-income* students. As documented in another recent report from the *Prospects* study (Puma, et al. 1996), low-income students—whether LEP or EP—consistently perform worse than higher-income students.

Specific findings related to LEP student outcomes include the following:

- Overall, after controlling for economic differences between LEP and EP students, the math achievement levels of LEP students—as measured by test scores—are not so different from those of EP students. LEP exiters in the 1st grade cohort generally had *higher* math test scores than EP students. Further, while some groups of low-income LEP students had lower initial test scores than low-income EP students, there is evidence of catch-up; that is, LEP students' scores move closer to those of EP students over time. These same general results obtained for reading test scores, although the sample included in the reading score analysis was somewhat less representative (because it did not include students who took the Spanish language version of the test).

- In general, for all the outcomes examined in this chapter—English proficiency, reading test scores, math test scores, and grade retention—students who develop adequate levels of English language proficiency to exit LEP status have more favorable test and grade promotion outcomes than students with lower levels of English proficiency.

- Further, differences between LEP exiters and students who are LEP in every year *begin with the first year observed.* This suggests that LEP exiters may begin school with certain advantages over other LEP students and that these non-school factors may play a role in their continued higher achievement. To put it another way, where LEP students end up appears to depend strongly on where they start. The results also suggest that LEP students are a heterogeneous group.

- We find no clear evidence that LEP students are retained in grade any more or less often than EP students at these grade levels.

CHAPTER 1

DEFINING THE LEP POPULATION

Children with limited English proficiency make up an important and growing share of the students in U.S. public schools. These students—many of them foreign-born and/or the children of recent non-English-speaking immigrants—are expected to acquire the skills and knowledge that define the public school curriculum while at the same time mastering English as a second language. The challenge this poses to both students and schools has led to a number of educational responses (e.g., the spread of Bilingual Education and English-as-a-Second-Language (ESL) instructional practices, federal Title VII funding for supplemental language instruction) and a good deal of research.[1]

As a reflection of the importance attached to successfully educating children whose native language is not English, the U.S. Department of Education's longitudinal study of Chapter 1 assistance, *Prospects*, includes a component devoted to the analysis of limited English proficient (LEP) students.[2] The current report is the second of two focused on this population. A cross-sectional description of LEP students and their educational services during the 1991-1992 school year appears in Puma and Moss (1995). That analysis is extended here by examining the background characteristics, educational experiences, and academic outcomes of LEP students during the full four years of the *Prospects* study, from the school year ending in 1991 to the school year ending in 1994. We track a nationally-representative cohort of 1st grade students, and a separate nationally-representative cohort of 3rd grade students, through the elementary school years (grades 1 to 6) to document the experience of LEP students and contrast it with that of English proficient students.[3] While the analysis includes an assessment of how far LEP children progress academically during those years, because of resource constraints we do not attempt to attribute academic progress to specific types of instructional services nor to individual school or student characteristics. While clearly worthy of study using the *Prospects* data, resource constraints leave the question of *which* instructional practices and school environments lead to the best student outcomes lies beyond the scope of this analysis.

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[1] See, for example, Ramirez et al. (1991), Stanford Working Group (1993), Fleischman and Hopstock (1993), and Moss and Puma (1995). Valuable overviews of research on the LEP population appear in Lam (1992) and Gonzalez and Maez (1995).

[2] Chapter 1 is the primary federal program of assistance for educating disadvantaged students, renamed Title I in 1994. *Prospects*' special focus on LEP students was made possible through added data collection funded by the Department of Education's Office of Bilingual Education and Minority Languages Affairs (OBEMLA).

The report is divided into four chapters. The remainder of Chapter 1 examines the percentage of students who have limited proficiency in English during the primary school years, by grade level. This sets the stage for later chapters of the report. Chapter 2 then examines the non-school characteristics of LEP children in relation to their English proficient peers: their demographic and language backgrounds, family circumstances (economic and other), and at-home educational supports. The instructional services provided to LEP students by the nation's public elementary schools are profiled in Chapter 3 and, where possible, contrasted with services provided to English proficient students. Chapter 4 completes the picture by documenting the educational outcomes of LEP students—overall and in relation to their English proficient peers—including teachers' ratings of English proficiency, standardized test scores, and retention in grade.

Overview of the Chapter

Our purpose in this initial chapter is to document the percentage of LEP students in U.S. public schools during each elementary school year (1st through 6th grade)[4] and to identify individual LEP students in the *Prospects* data set for later analysis. While we touch on important substantive questions along the way (e.g., which LEP students receive special instructional services, how many go unidentified in the early years of grade school), *our primary goal in this chapter is to define and identify the LEP population* that will be the focus of the rest of the report. As explained in more detail below, we are forced to develop our own, research-based criteria for categorizing students as limited English proficient, since no standard national definition exists.

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[3] The *Prospects* data do not include a sufficient number of LEP students in the 7th grade cohort to extend the analysis past the 6th grade. Data on the 1st grade cohort cover only three school years, those ending in 1992, 1993, and 1994. See Appendix B for a full description of the Prospects study design.

[4] This study follows a fixed sample of students over time. This means that the sample is fully representative of students in the first year for each cohort, but does not take into account later entrants. This issue is explained in more detail below.

We begin the next section with a summary of the legal requirements for providing instructional services to LEP students. This background provides context for our approach to identifying LEP students as described in this chapter and the analysis of instructional services provided to LEP students in Chapter 3. In the following section, we describe the sample to be analyzed and the measures of limited English proficiency available from the *Prospects* data, including their limitations. Using these measures, we then describe the overall size of the LEP group in each year, and show the proportions of this group reported as LEP in all observed years. Attention then focuses on the two broad categories of LEP students identifiable in our data: those perceived by school staff as having limited proficiency in English and those reported as receiving ESL and/or Bilingual Education services. We show which students fit in both or only one of these categories at some point during the observation period and provide analogous information for each of the more detailed criteria used to identify LEP status (e.g., ability to be tested in English, receipt of specific types of language instruction). This information provides an overall picture of the relative importance of the various criteria in defining the LEP population for this study.

We then turn to a more dynamic perspective, analyzing how perceptions of limited English proficiency and receipt of LEP-related services change over time for those students who meet our LEP criteria at some point. Next, we look more closely at transitions in and out of the identified LEP group from year to year. Here, we focus on *LEP entrants*—the students who do not meet any LEP criteria until after the first year of observation—and *LEP exiters*—students who are in the LEP group initially but later do not meet any LEP criteria. The sizes and characteristics of these groups help to provide a sense of how dynamic the LEP population is during the observation period. A final section of the chapter draws on the earlier analyses to identify specific subsets of students, both LEP and English proficient, for further analysis in the remainder of the report.

LEGAL CONTEXT FOR PROVISION OF SERVICES TO LEP STUDENTS

There are two primary sources of legal requirements for providing educational services to LEP students: federal civil rights laws, and state-level statutes.[5]

Title VI of the 1964 Civil Rights Act, which prohibits discrimination on the basis of national origin by any entity receiving Federal funds,[6] and the Equal Education Opportunities Act of 1974 are the basis for several court decisions requiring special instructional services to students who are limited English proficient. The most prominent court decision on the rights of LEP students, and the only such ruling by the U.S. Supreme Court, is *Lau v. Nichols* (1974). Justice William Douglas wrote:

> *There is no equality of treatment merely by providing students with the same facilities, textbooks, teachers, and curriculum; for students who do not understand English are effectively foreclosed from any meaningful education. (Crawford 1995, p.45)*

The ruling entitled students covered by the lawsuit to special assistance to enable them to participate equally in school programs. The ruling supported the former Department of Health, Education, and Welfare's Office for Civil Rights (OCR) May 25th, 1970 memorandum that explicitly discussed school districts' responsibilities for providing equal education opportunities for limited-English proficient students. OCR's May 25th memorandum advised school districts that:

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[5] See Crawford (1995) for a more in-depth discussion of federal policy and legal requirements for providing educational services to LEP students.

[6] Most school districts receive federal money through the Chapter 1 (now Title I) program. This program provides funds for supplemental educational services for children who are educationally deprived due to being from a low-income family or community, criteria met by most LEP students. Although primarily a source of funding for supplemental reading and math, Chapter 1/Title I is an important source of funding for supplemental instruction of LEP students (see Chapter 3 of this report). Eligibility rules for Chapter 1 do not mandate specific instructional methodologies for teaching LEP students. The Chapter 1 law, in effect during the *Prospects* study period, required that programs distinguish between educational deprivation and limited English proficiency when determining eligibility for programming. Title I, adopted as part of the Improving America's Schools Act of 1994, eliminates this distinction, so that even more limited English proficient students are likely to benefit from supplemental instruction from this funding source (Anstrom 1995 and Hoff 1997).

> *Where the inability to speak and understand the English language excludes national origin minority group students from effective participation in the educational program offered by a school district, the district must take affirmative steps to rectify the language deficiency in order to open its instructional program to these students.*

When investigating complaints and conducting Title VI compliance reviews for LEP students, the Department of Education's Office for Civil Rights first determines whether language minority students are able to participate effectively in the regular instructional program. If language minority students are not able to effectively participate, the school district has a responsibility to identify students whose lack of English language skills precludes them from effective participation and to provide them with instruction that will enable them to: acquire English language skills, and master the content knowledge and skills that are being taught to all children. School districts have a great deal of flexibility in developing and implementing alternative language programs to meet the needs of their LEP students.

In considering whether there is a need for a school district to provide an alternative language program and whether the program is likely to be effective, factors that OCR is likely to examine include whether:

- The district has identified all LEP students who need special language assistance;
- The district has ensured the placement of LEP students in appropriate programs;
- All LEP students who need a special language assistance program are being provided such a program;
- The district has taken steps to modify a program for LEP students when that program is not working;
- The district ensures that LEP students are not mis-assigned to classes for students with disabilities because of their inability to speak and understand English; and
- The district ensures that parents who are not proficient in English are provided with appropriate and sufficient information about all school activities.

In reviewing alternative programs, OCR also considers the following questions:

- Is the alternative program based upon an educational theory that is recognized as sound or as a legitimate experimental theory by some experts in the field?
- Are the programs and practices reasonably calculated to implement effectively the educational theory adopted?
- Has the alternative program succeeded, after a reasonable period of time, in producing results indicating that students' language barriers are actually being overcome, and if not, has the program been appropriately modified?

These questions are based upon the analysis in *Castenada v. Pickard*, 658 F.2d 989 (5th Cir. 1981) which OCR adopted in its September 27, 1991 policy memorandum entitled "Update on Schools' Obligation Towards National Origin Minority Students with Limited-English-Proficiency."

In addition to the general requirements for all school districts inherent in the Title VI compliance review, local court decisions affect the provision of services in certain school districts. For example, a lawsuit brought by Aspira, a Puerto Rican advocacy group, against the City of New York in 1974, resulted in a ruling guaranteeing bilingual instruction for LEP students whose native language is Spanish.

The second source of legal requirements for provision of instructional services to LEP students is state statutes. A majority of states have passed laws explicitly *permitting* native-language instruction, about 20 percent of states *require* bilingual education under certain circumstances. A few states have laws *prohibiting* instruction in a language other than English, but Crawford (1995, p.42) states that the English-only laws are no longer enforced.

In summary, the legal requirements for providing instructional services for LEP students during the *Prospects* study period are as follows:

- To comply with Title VI of the Civil Rights Act, school districts receiving any federal funding are required to have procedures to identify LEP students, accurately assess their English-language skills for appropriate placement, and competently provide special assistance to LEP students that will allow LEP students the same access to educational services as English proficient students.

- The type of special assistance to LEP students required for compliance with Title VI is not prescribed, but court decisions have guaranteed specific instructional methodologies (e.g., bilingual education) for LEP students in some school districts.
- Some state statutes mandate bilingual education services for LEP students under certain circumstances.
- While most schools receive some federal funds, school districts not receiving federal funding are not required by Title VI of the Civil Rights Act to provide any special assistance to LEP students.

THE LEP INDICATOR VARIABLES

Throughout the chapter, we apply the broadest possible definition of limited English proficiency as the starting point for examining the LEP population. Thus, a student is classified as LEP in a given year if the *Prospects* data indicate:

- *Receipt* of special services due to a student's limited English proficiency; or
- A *perception* on the part of school staff that the student has limited proficiency in English.

Thus, either the receipt of special services or the perception that special services might be appropriate qualifies a student for inclusion in the LEP sample.

Our use of receipt of special services, such as ESL/BE services, as an indication that a student is limited English proficient is supported by findings reported in the *Prospects* Interim LEP Report (Moss and Puma, 1995) on the procedures schools use to determine entry into and exit from ESL/Bilingual programs. Moss and Puma found that almost all schools attended by LEP students in 1991-92 used multiple indicators of English proficiency skills for entry and exit decisions, usually including objective tests of English and cognitive proficiency. Furthermore, about 85 percent of LEP students attended schools that used four or more indicators for entry and exit decisions. In both cohorts, the most common indicators used for entry into ESL/BE services are (in order of usage): English tests of oral and/or aural proficiency, home surveys of non-English use, non-English tests of oral and/or aural proficiency, assessments of English reading proficiency, and assessments of non-English reading proficiency. Schools rely even more heavily on tests in English for determining exit from ESL/BE services. The most common indicators for exit from ESL/BE services are: tests of English oral/aural proficiency, tests of English reading proficiency, achievement tests in content subjects conducted in English, teacher judgements, and input from parents.

Because we do not have *Prospects* data on some of the most common indicators schools use for placement into and out of ESL/BE programs, we developed other procedures for identifying LEP students. The first general indicator we use to identify LEP students is receipt of ESL/BE services. That is, we take the outcome of a school's assessment of a student's English language proficiency—whether or not a student receives ESL/BE services—as an indicator of whether the student is limited English proficient.

As stated at the beginning of this section, we also use teacher judgements of students' English proficiency as an indicator of students' proficiency status. We use this additional indicator of students' English proficiency for several reasons: a student may be receiving special assistance due to limited English proficiency that the school does not classify as ESL/BE instruction, some schools may not provide special assistance to LEP students (see the section above on legal requirements), and we may have missing or erroneous data on whether or not a student receives special LEP-related services.

While not ideal from the standpoint of educational practice, nor equivalent to an in-depth assessment of *actual* English language abilities for each child, this "working definition" of the LEP population is the best one available from the data. Not only are the *Prospects* data limited in how well they measure actual language proficiency, there are no generally recognized standards for what level of proficiency constitutes "limited English proficiency." Each state has its own definition (see Cheung and Solomon 1991), and how a definition is implemented is likely to vary within a state. In light of this situation, we choose to categorize a student as LEP when any of the indicators available to us in the data suggest that she or he might have limited proficiency in English. This broad definition allows us to examine the interaction between perceived language needs and the receipt of LEP-related services when defining the subset of students for whom limited English language proficiency has some sort of special significance.[7]

Most of the analysis in this chapter is based on the individuals who are part of the LEP group, so defined, *at some point during the observation period*, i.e., those students who are classified as LEP in one or more of the years in which they are observed. Exhibit 1.1 shows the grade level and year that students included in this report were assessed in the *Prospects* study (see Appendix B for a full description of the sample design). A nationally-representative cohort of 1st grade students is observed for three years (1992-1994), while a separate nationally-representative cohort of 3rd grade students is observed for four years (1991-1994). For both groups, we restrict our attention to those individuals who are in the *Prospects* database throughout the follow-up period, excluding students who move out of the study schools and are not followed.[8] As a result of these selection rules, the LEP analysis sample in this chapter includes:

- Students in the 1st grade cohort who meet one or more of the LEP criteria in either 1st, 2nd, or 3rd grade, and who are in the *Prospects* database in all three years; and
- Students in the 3rd grade cohort who meet one or more of the LEP criteria in any of grades three through six, and who are in the *Prospects* database in all four years.

Several variables in the *Prospects* data set identify students who *received LEP-related services*.[9] These variables indicate whether a student was:

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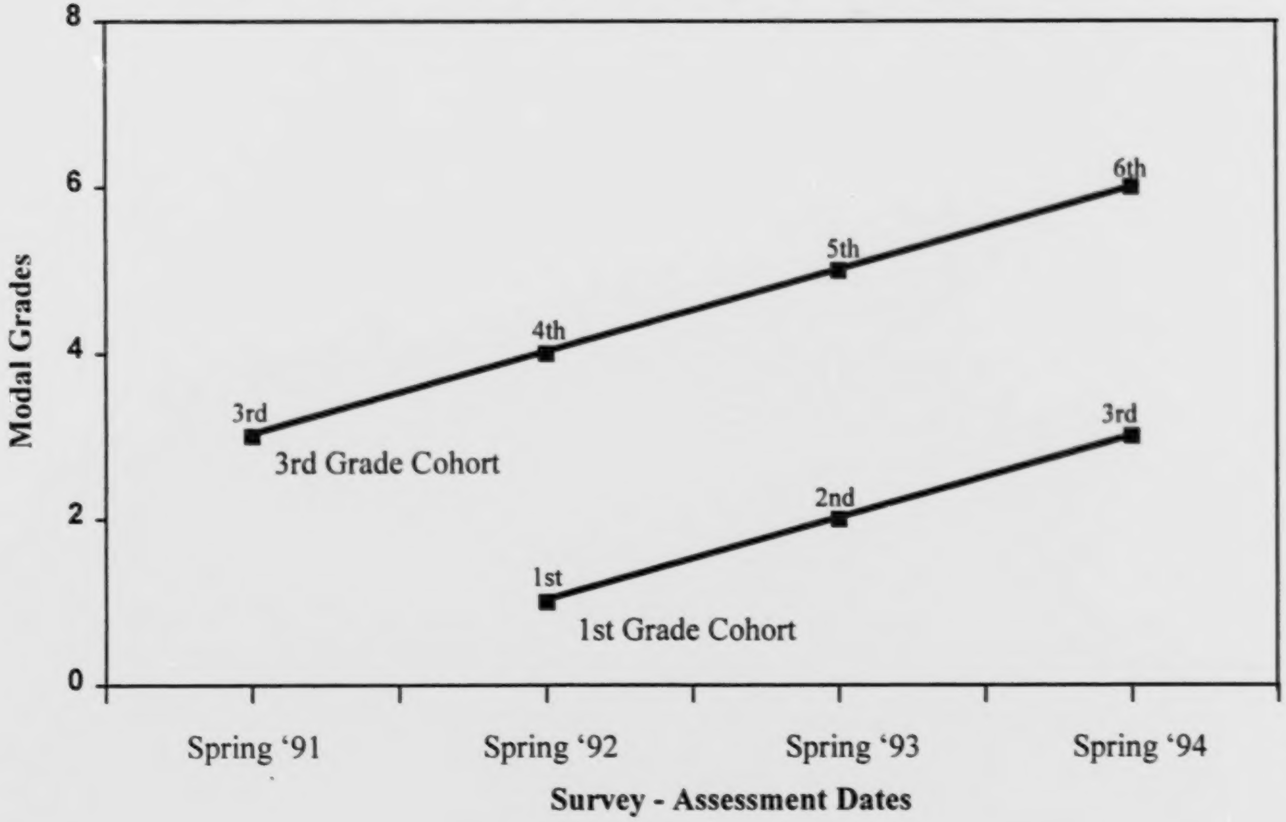
[7] More graduated definitions of limited English proficiency could also be considered, to differentiate among students with different levels of English language ability within the overall LEP group. We rejected this course for several reasons: (i) we do not have sufficient faith in any of the *individual* LEP indicator variables used to rely on them as the basis for making fine-tuned distinctions regarding the degree of language ability; (ii) adopting multiple categories of LEP students would substantially complicate later analyses, where just maintaining an overall two-way distinction between LEP and non-LEP generates a large number of numbers to be considered; and (iii) the inclusion of *all* possible gradations of "LEPness" that accompanies our broad "LEP/not LEP" dichotomy conforms best to the goal of considering in this report everyone for whom English language proficiency has some sort of special significance.

[8] All numbers presented in this report are weighted to take into account students who moved. We followed a random sample of students who moved, and weighted these students so that they represent all movers. This procedure ensures that movers do not bias our sample.

[9] See Appendix A for the exact wording of the questions used to collect these variables.

Exhibit 1.1

***Prospects* 1st and 3rd Grade Cohort Data Collection Points for This Report**



- Reported (by her/his primary teacher) as having received ESL instruction;
- Reported (by her/his primary teacher) as having received Bilingual Education instruction;
- Reported (by her/his primary teacher) as having received special services of an unspecified type due to limited English proficiency;
- Listed in school records as receiving ESL or Bilingual Education instruction; and/or
- Associated with a specific ESL and/or Bilingual Education teacher (other than the regular or Chapter 1 teacher) when the *Prospects* study sought to collect additional information from teachers.[10]

Of these five variables, school records of the receipt of ESL or Bilingual Education instruction should encompass the most students, for two reasons. First, unlike the earlier teacher-reported variables on the list, this indicator includes both ESL and Bilingual Education services in one place, which cannot be separated in our abstracts from school records. The school records indicator is also the only LEP variable that covers the entire school year; all of the other indicators—including those related to school staff perceptions—apply to the point in time when data were collected for the *Prospects* study (in the spring of each year).

Though less comprehensive, teacher reports of receipt of special services are important to distinguish between ESL and Bilingual Education instruction and, potentially, to identify recipients of ESL and Bilingual Education services not documented by abstracts from school records. Association with a particular ESL and/or Bilingual Education teacher during *Prospects* data collection provides an additional opportunity to identify recipients of LEP-related services who may have been overlooked by the other four measures.[11]

Perceptions of limited English proficiency are indicated by three variables provided by school staff during each year of the study:[12]

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[10] This indicator is not available for the 1994 school year.

[11] Association with a bilingual education teacher, however, does not imply that a student is LEP, because it encompasses native English speakers in two-way bilingual programs. Consequently, this criterion alone was not sufficient to categorize a student as LEP for purposes of this study. See Appendix A for more details.

[12] See Appendix A for the exact wording of the questions used to collect these variables.

- Did the student's primary teacher consider him or her to be limited English proficient?
- Did the school consider the student unsuitable for testing in either English or Spanish when *Prospects* administered a standardized achievement test for reasons of English language proficiency?
- Did the school prefer testing in Spanish rather than English when *Prospects* administered a standardized achievement test?

Schools were urged to allow testing of all students in English (using McGraw-Hill's CTBS test instrument) or, failing that, in Spanish (using McGraw-Hill's SABE instrument).[13]

It is not clear how exacting primary teachers were in classifying students as limited English proficient. They were simply asked (on the Student Profile) whether the student was "limited-English-proficient," with no definition stated in the question. This would seem to allow for a range of definitions of LEP, from broad to narrow, depending on the teacher. A narrow definition was intended, however, since instructions at the beginning of the questionnaire defined LEP students as those "whose native language is other than English and whose skills in listening to, speaking, reading, or writing English are such that he/she derives little benefit from school instruction in English." Data presented later in the chapter show that teacher designation as LEP occurred more frequently than the other two indicators of perceived LEP status, perhaps suggesting that some teachers adopted a fairly broad or more reliable definition of "limited-English-proficient."

IMPUTATION OF MISSING DATA

Large scale survey studies, particularly those conducted over a period of several years typically have substantial amounts of missing data. This is the result of individuals who move out of the scope of the study, a respondent's refusal to fill out a survey at one or more points during the repeated data collections, nonresponse to specific survey questions, or other factors.

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[13] These and other data collection instruments from the *Prospects* study are described in Appendix B, an overview of the *Prospects* study design.

Often the missing data is disproportionately concentrated in particular parts of the group being studied. For example, in many studies, LEP students have been excluded, or only those LEP students with higher levels of English language have been included. For some variables in the *Prospects* study, there were substantial levels of missing data for some of the variables that are important for analyzing the education of limited English proficient students.

When data is not missing at random, analysis of the raw data or of weighted data that does not take this into account often leads to seriously misleading analyses and results.

To avoid this problem, this study—like most large scale longitudinal studies—has used imputed data. (See Appendices A, D, and I for details.) Like most surveys, the instruments for this study included instructions for respondents to skip certain questions that did not apply to them. The imputation procedures included filling in these legitimate skips with data values consistent with other information in the survey. This type of imputation was done for the survey question on teachers' judgements of LEP students' English proficiency. Because of the way the questions were asked and the amount of imputation, there is some uncertainty about the percentage of LEP students judged to have "excellent" English proficiency (see Appendix I). While the data can identify the likely range, we cannot pinpoint it exactly within that range.

While great caution was used in developing and assessing the imputation quality, the procedure necessarily rests on various methodological assumptions. In some cases the imputation had little or no impact on the patterns found in the analytic data set as compared to the raw data. In a few cases the imputation leads to substantial changes. (For example, see the discussion in Appendix I and Exhibit I.1 in particular.) Although the imputation results have been verified through comparisons with the raw data, analysis of covariation with related variables and other procedures, there is necessarily a level of ambiguity regarding where in this range the actual underlying value of a variable falls. As in any other report, the results should be read keeping in mind the possible impacts of missing data and imputation on findings.

OVERALL LEP STATUS, BY COHORT AND YEAR

We begin by calculating the size of the overall LEP population. Exhibit 1.2 shows the percent of all students in the sample (from unweighted data) and in the population of all U.S. public school students (from weighted data) classified as LEP by one or more of the eight indicator variables listed above, by cohort and year.[14] As can be seen from the final row listed for each cohort in Exhibit 1.2, about 18 percent of the sample and—following weighting—9 percent of the nation's population of public school students are categorized as LEP at some point in the follow-up period. This is the group of central interest in this report.[15]

For both cohorts, the percent of students identified as LEP in any of the three (or four) years of the study—9 percent—is substantially higher than the percent of students identified as LEP in any single year—about 6.5 percent on average. This is because students leave LEP status over time.[16] Thus the population of students who are of concern to policy makers is substantially larger than estimates based on a point in time.

Looking down the columns in Exhibit 1.2, we see a gradual decline in the percentage of students in the LEP group across grade levels, from 7.6 percent of the public school population in the 1st grade to 5.6 percent in the 6th grade (a decline across cohorts of about 25 percent in the number of LEP students). Both the decline and its gradual nature are expected: some number of students should acquire full proficiency in English for the first time in any given year, though many students will not, taking instead several years to reach this major learning milestone.

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[14] The figures in Exhibit 1.2 and elsewhere in the chapter are based on edited data. Missing values for a particular LEP indicator are replaced by imputed values, following procedures described in Appendix A. Appendix C shows the percentage of cases affected by these procedures, which is generally small.

[15] Ideally, we would like to broaden our focus to include students who meet our LEP criteria in *other* years outside those covered by the *Prospects* data. This would be particularly useful for students in the third grade cohort who may have met one or more criteria in earlier grades but no longer do so by the time we observe them. Data on English proficiency and receipt of special services in the years prior to sample entry are too limited to make distinctions between "previously LEP" and "never LEP" students on this basis.

[16] Other research indicates that, on average, it takes five to ten years for non-native speakers of English to develop enough proficiency to catch up with their native-English speaking peers (Thomas and Collier 1997; Collier 1995; Cummins, 1981).

Exhibit 1.2

Percent of Sample and National Population of Public School Students Identified as LEP Based on Indicator Variables in *Prospects* Data, by Cohort and Year

Cohort and Year	Percent of Sample (Unweighted)	Percent of Population (Weighted)
1st Grade Cohort (N=9,240)		
1992 (1st grade)	15.7	7.6
1993 (2nd grade)	15.2	6.8
1994 (3rd grade)	13.3	6.7
LEP in Any of the Three Years	*17.8*	*9.3*
3rd Grade Cohort (N=9,510)		
1991 (3rd grade)	14.5	6.6
1992 (4th grade)	14.1	6.1
1993 (5th grade)	12.5	5.5
1994 (6th grade)	11.2	5.6
LEP in Any of the Four Years	*18.3*	*8.6*

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated.

Thus, we would expect still further declines in later years (i.e., past 6th grade), though we cannot follow any students that far in the available data.

Our estimates of the LEP population by grade are consistent with other estimates for the same time period.[17] Fleischman and Hopstock (1993, p.10) report that 7.9 percent of first graders were LEP in the fall of 1991 compared to our estimate of 7.6 percent in the spring of 1992.[18,19] Similarly, Fleischman and Hopstock report 6.0 percent of third graders were LEP in the fall of 1991, compared to our estimate of 6.1 percent in the spring of 1991. Their estimates for elementary school students in the fall of 1991 also show a decline in the percent of LEP students at higher grade levels similar to the decline in our estimates. Overall, these results are closer than might be expected given the different methodologies.[20]

Other sources of estimates of the LEP population for the same time period do not report their estimates by grade level, and hence are not strictly comparable to our estimates, but nevertheless appear generally consistent with our estimates. For example, Han et al. (1997, p.8), using data from the national Schools and Staffing Survey, estimate that 6 percent of elementary school students are limited English proficient in the 1993-94 academic year. Averaging the grade-level data from the two *Prospects* cohorts over the 1991 to 1994 period results in a comparable estimate of 6.4 percent of elementary school students being LEP. Based on 1990 Decennial Census data on households, GAO (1994, p.34) reports that 5.2 percent of five to seventeen-year-olds are LEP, but they do not report grade- or age-specific estimates to compare to our estimates for elementary school grades.[21]

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[17] See Hopstock and Bucaro (1993) for a summary of estimates of the LEP student population.

[18] The spring of 1992 is the first date that data on our LEP indicators are available for the 1st grade cohort, whereas data are available for the 3rd grade cohort starting in the spring of 1991 (see Exhibit 1.1).

[19] Although *Prospects* surveys were administered in the spring, the LEP indicator variable from school records, receipt of ESL/BE services, refer to the student's status at any time during the academic year.

[20] The *Prospects* study follows two groups of students over a three (1st grade cohort from 1992 to 1994) or four year period (3rd grade cohort from 1991 to 1994), while Fleischman and Hopstock examine each different grade cohort for the same year, 1991. In addition, our estimates are from surveys administered by on-site interviewers to teachers and school staff on the status of individual students, whereas Fleischman and Hopstock's estimates are from a mail survey of LEP coordinators (or their equivalents) at local school districts on the aggregate percent of students who are limited English proficient in each grade.

In looking at patterns over time, we adopt the convention in this report of labeling each year's results as though all students remained on grade level throughout the follow-up period. For example, that we call the third year of follow-up for the 1st grade cohort "3rd grade," even though some of the students in that cohort may be in 2nd grade in that year, i.e., they did not advance on grade level during 1st or 2nd grade. We should also note that in longitudinal samples of this sort, later years of data are not fully representative of the grade level to which they pertain. Thus, for example, 1994 data for the 1st grade cohort do not represent *all* public school 3rd graders in the nation even with universal advancement on grade level, since some number of students *enter* U.S. public schools between the 1st and 3rd grades but are not included in the sample.

This latter point is particularly important to bear in mind when comparing 1994's "3rd grade" findings for the 1st grade cohort, which are not representative of all 3rd graders in the nation in that year, with 1991's 3rd grade findings for the 3rd grade cohort, which are nationally representative for 1991. Both the sample and *calendar year* used to derive the results shift at the 3rd grade "seam" in the data: from 1994 data for a nationally representative sample of 1992's 1st graders to 1991 data for a nationally representative sample of 1991's 3rd graders. Because of these shifts, we will hold comparisons across cohorts to a minimum in this report and—when used—interpret them as only suggestive of how a single group of students would have progressed had they been tracked continuously throughout their grade school years during the 1990s. It is not appropriate to treat these data as though they provide information on a single cohort for grades 1 through 6.

The overall pattern of year-by-year results in Exhibit 1.2 masks some important changes for individual students. Exhibit 1.3 uses longitudinal profiles of LEP status for individual students to show the share of the population in each of three subgroups—students who are:

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[21] The estimate from the 1990 Census is a count of the number of children age 5 to 17 who spoke a language other than English in the home and who were rated as *speaking* English less than "very well." Although widely cited as an estimate of the LEP population, it has two major shortcomings: it addresses only one dimension of English proficiency, speaking; and it is based on subjective rankings of a child's English speaking proficiency by someone who may not be knowledgeable of grade-appropriate proficiency levels.

Exhibit 1.3

Longitudinal Patterns of Inclusion in the LEP Group, by Cohort

Cohort	Percent of Population (Weighted)	
1st Grade Cohort (N=9,240)		
English proficient	90.7	
LEP	9.3	
LEP in All Observed Years		*5.1*
LEP in Some Years		
2 years		*1.5*
1 year		*2.7*
3rd Grade Cohort (N=9,510)		
English proficient	91.4	
LEP	8.6	
LEP in All Observed Years		*3.9*
LEP in Some Years		
3 years		*1.2*
2 years		*1.0*
1 year		*2.5*

- Categorized as LEP in all observed years;
- Categorized as LEP in some but not all observed years; and
- Categorized as LEP in none of the observed years.[22]

The first point to note from the exhibit is that the great majority of elementary students were not categorized as LEP *at any time during the study period*: 90.7 percent of the 1st grade cohort, and 91.4 percent of the 3rd grade cohort. These percentages would likely be somewhat lower were a single cohort of students tracked continuously through all 6 elementary school years, since some of the 1st grade cohort students not categorized as LEP in grades 1 through 3 might have been so categorized in later years (were more data available) and, similarly, some of the 3rd grade cohort students not categorized as LEP in grades 3 through 6 might have been so categorized in earlier years. Even recognizing this possibility, it seems likely that close to 90 percent of all public school students neither receive special LEP-related services nor are considered by school staff to be limited English proficient throughout their first six years of grade school.

Exhibit 1.3 shows the prominence of students who are classified as LEP in *all* observed years among the students classified as LEP *in any one year*. For example, of the 6.7 to 7.6 percent of the 1st grade cohort categorized as LEP in any particular year (see Exhibit 1.2), 5.1 percent are the same students: those listed as "LEP in All Observed Years" in Exhibit 1.3. Similarly, of the 5.5 to 6.6 percent of the 3rd grade cohort listed as LEP in specific years (see Exhibit 1.2), 3.9 percent are the same students. In all, one-half to three-fourths of the students classified as LEP in any one year are classified as LEP in all years of the follow-up period. Presumably, this share would fall somewhat if we were to track a single cohort over all six years from grade 1 to grade 6, since classification in the LEP group might not occur in some other year. The central point seems likely to hold nonetheless: a sizeable fraction of the students perceived and/or served by their schools as LEP at some point during their elementary years are perceived and/or served as LEP throughout those years.

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[22] For simplicity, we suppress sample-based percentages in this exhibit and the remainder of the report, focusing instead on (weighted) population estimates.

Other research indicates that, on average, it takes five to ten years for non-native speakers of English to develop enough proficiency to catch up with their typical native-English speaking peers, as measured by grade-level-appropriate academic tests in English (Thomas and Collier 1997; Collier 1995; Cummins, 1981).[23] Given these research findings, it is not surprising that our data show a majority of LEP students remaining LEP for the duration of our study: we observe students for three or four years, not enough time for most students with limited proficiency in English to become proficient.

Exhibit 1.3 also shows that an important number of students are classified as LEP in some but not all observed years: almost half of the LEP students in the 1st grade cohort, and over half of the LEP students in the 3rd grade cohort. This subset includes students whose classification as LEP ends during the observation period, as well as those who become classified as LEP for the first time in later years of the study period. This category also includes some students whose classification as LEP or English proficient (EP) made more than one transition during the follow-up period (e.g., LEP in year 1, EP in year 2, and LEP again in year 3). Transitions out of and into LEP status are discussed in more detail later in this chapter.

THE RELATIVE IMPORTANCE OF PERCEPTIONS VERSUS SERVICES

What is the relationship between staff perceptions of students' proficiency in English and receipt of LEP-related services? What is the relative contribution of each of the eight LEP indicators described earlier to identifying the sample of LEP students for this study? We address these issues in this section.

To simplify the analysis, we confine our attention to the students categorized as LEP at some point during the follow-up period, omitting for the time being the "Not LEP" group shown in Exhibit 1.3. With this exclusion, our findings in the remainder of the current chapter are based on the 1,642 students in the 1st grade cohort who were perceived and/or served as LEP in at least one of the three years of follow-up, and on the 1,739 students in the 3rd grade cohort who were perceived and/or served as LEP in at least one of the four years of follow-up.

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[23] Thomas and Collier (1997) suggest that the catch-up period is five to seven years for LEP students with at least two years of native language instruction in their home country, and seven to ten years for LEP students with no formal schooling in their native language.

Within these two groups, the upper panel of Exhibit 1.4 shows that, for the purposes of our analysis, we identify students as LEP more often because they receive language-related services than because their teachers (or other school staff) identify them as LEP.[24] Around 90 percent of the LEP population in each cohort received a LEP-related service during the study period, while more than 25 percent were not identified by any surveyed teacher as LEP during the study. Because of missing data, the 25 percent estimate is likely an overestimate of the percent of students receiving LEP services, but not perceived by their teacher as LEP. To the extent that teachers would have identified students as LEP in some of the cases where teacher reports are missing, the percent served but not perceived would be lower than 25 percent. The multiple indicators discussed above that are used by schools for student entry and exit from services (such as test results and teacher input) probably provide more precise measurement of student ability to understand, speak, read, and write English in classroom contexts than a single teacher survey question. However, teacher perception of student language background and ability is important for understanding the educational process.

The lower panel of the exhibit adds some details to these patterns. It shows the percentage of LEP students in each cohort that met *both* of the broad criteria for inclusion in the sample—perceptions and services—at some point during the follow-up period, as well as the percentage meeting *only one* of those criteria. As can be seen in the first row of the lower panel, nearly two-thirds of all LEP students were both perceived as LEP and received LEP-related services at some point during the follow-up period (although not necessarily in the same year).[25] This indicates a fairly strong correspondence between these two broad categories of perceived LEP needs versus LEP services.

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[24] The process we use in this study to identify students as LEP provides no information about the process schools use to select students for entry into or exit from ESL or bilingual services. On the latter issue, see the discussion earlier in this chapter or the interim report for this study (Moss and Puma 1995, pp. 4-7 through 4-10).

[25] The next section of the chapter looks at the extent to which LEP perceptions and services overlap in a given year.

Exhibit 1.4

Percent of LEP Students Perceived versus Served as Limited-English Proficient at Any Point During the Follow-Up Period, by Cohort

	1st Grade Cohort (N=1,642)	3rd Grade Cohort (N=1,739)
Total Either Perceived or Served as LEP		
Perceived	74.4	73.6
Served	88.9	93.0
Relationship Between Perceived and Served		
Both Perceived and Served	63.3	66.6
Perceived Only	11.1	7.0
Served Only	25.6	26.4

However, it is also clear that an important share of the LEP population was either perceived as LEP, but never received LEP-related services during the study period based on available data, or was never reported as perceived as LEP by school staff but did receive services. These two subgroups—the latter much larger than the former—constitute important subsets of LEP students. We look at the breakdown of these two groups by year—and consider the reasons why students may fall into these two groups—later in the chapter.

Exhibits 1.5 and 1.6 show the contribution of the eight individual LEP criteria in defining the two broad categories of perception and service receipt and, hence, the overall LEP population. Here, the criteria are ordered by prevalence within each broad category. Separate tables are provided for each cohort. The first column of each table shows the extent to which the LEP population met each of the individual criteria at some point during the study period. This column sums to more than 100 percent because most students categorized as LEP met more than one criterion. The second column shows the amount by which the size of the overall LEP population would decrease if a particular criterion were removed. For example, if the criterion "Identified as LEP by teacher" in row 1 of Exhibit 1.5 were removed, the LEP population for the 1st grade cohort would drop 8.9 percentage points.

As can be seen, each of the eight LEP criteria were met by at least one in five LEP students for both the 1st and 3rd grade cohorts. Further, the ordering of the criteria by importance (i.e., prevalence) is the same for the two cohorts within the two broad categories of perception and service. For both cohorts, the most important criteria (in the sense of being met most often) are receipt of ESL or Bilingual Education instruction as indicated by school records,[26] and the teacher's identification of a student as LEP. More than two-thirds of the LEP population met each of these criteria at some point during the follow-up period.

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[26] As noted earlier, receipt of bilingual education instruction by itself was not sufficient to categorize a student as LEP for this study. See Appendix A for details.

Exhibit 1.5

Contribution of Individual Criteria to the LEP Population During the Follow-Up Period: 1st Grade Cohort (N=1,642)

Criterion	Percent Meeting Criterion at Least Once During the Follow-Up Period	Percent Meeting *Only* this Criterion
Perceived as LEP		
Identified as LEP by teacher	70.0	8.9
Took Spanish-language test (SABE)	27.4	0.0
Identified by school as LEP for purposes of *Prospects* standardized achievement test	22.7	1.6
Received LEP Services		
Recipient of ESL or Bilingual Education instruction, from school records	70.2	6.5
Recipient of ESL instruction, as classified by primary teacher	51.2	0.7
Recipient of Bilingual Education instruction, as classified by primary teacher	38.9	0.2
Associated with a non-Chapter 1 ESL and/or Bilingual Education teacher	27.1	0.8
Recipient of unspecified services due to limited English proficiency, as classified by primary teacher	25.0	7.2

Exhibit 1.6

Contribution of Individual Criteria to the LEP Population During the Follow-Up Period: 3rd Grade Cohort (N=1,739)

Criterion	Percent Meeting Criterion at Least Once During the Follow-Up Period	Percent Meeting *Only* this Criterion
Perceived as LEP		
Identified as LEP by teacher	67.1	6.0
Took Spanish-language test (SABE)	29.5	0.1
Identified by school as LEP for purposes of *Prospects* standardized achievement test	22.9	0.8
Received LEP Services		
Recipient of ESL or Bilingual Education instruction, from school records	75.0	9.8
Recipient of ESL instruction, as classified by primary teacher	49.9	1.2
Recipient of Bilingual Education instruction, as classified by primary teacher	39.7	0.9
Associated with a non-Chapter 1 ESL and/or Bilingual Education teacher	33.8	3.0
Recipient of unspecified services due to limited English proficiency, as classified by primary teacher	27.9	4.2

The same two criteria make the biggest *unique* contributions to the LEP population as well, as shown in the second column of the exhibits.[27] By this measure—the marginal contribution of a given factor once all other factors have been taken into account—the most important criterion for defining the LEP population differs by cohort. For the 1st grade cohort (Exhibit 1.5), it is identification as LEP by the student's primary teacher, with receipt of various types of LEP-related services (unspecified teacher-reported services, ESL or Bilingual Education instruction in school records) next in importance. This pattern is essentially reversed for the 3rd grade cohort (Exhibit 1.6), where receipt of ESL or Bilingual Education instruction in school records makes the largest marginal contribution, followed by teacher identification as LEP. In each case, the single largest contributor to the overall LEP group accounts for less than 10 percent of the full LEP population on its own. The five least important LEP criteria (those not mentioned in the above discussion) each have very small effects on the size of the overall LEP population; eliminating any one would reduce the LEP group by at most 3 percent.[28]

THE ROLE OF PERCEPTIONS AND SERVICES IN DEFINING THE LEP POPULATION OVER TIME

The previous section looked at the importance of perceptions and services in defining the LEP population *over the study period as a whole*. This section takes a dynamic perspective, considering the importance of each set of factors *year by year* and to see how their relative importance changes over time.

The basic approach is to revisit the information from Exhibit 1.4 on a year-by-year basis, in separate tables for each cohort (Exhibits 1.7 and 1.8, respectively). The top panel of each exhibit shows the percentages of the LEP population that fall into each of the two broad categories of LEP indicators—perceptions and LEP services—each year. The bottom panel then

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[27] The figures in the second column of Exhibits 1.4 and 1.5 are not additive. For example, while the five smallest numbers in that column sum to less than 10 percent, it is not the case that eliminating *all* five criteria would reduce the LEP sample by less than 10 percent. This is because some students are identified by multiple criteria, but only within these five smallest criteria. Therefore, eliminating the five smallest criteria would cause additional students to be dropped from the sample besides the students actually counted in column 2.

[28] As noted earlier, association with a non-Chapter 1 ESL and/or Bilingual Education teacher was not measured in 1994. This may slightly reduce the contribution of this criterion to the overall LEP population.

Exhibit 1.7

Percent of LEP Students Perceived versus Served as Limited-English Proficient, by Year: 1st Grade Cohort (N=1,642)

	1992 (1st grade)	1993 (2nd grade)	1994 (3rd grade)
Total Either Perceived or Served as LEP			
Perceived	64.7	58.0	49.7
Served	72.9	65.5	64.4
Relationship Between Perceived and Served			
Both Perceived and Served	56.6	50.9	42.0
Perceived Only	8.1	7.1	7.7
Served Only	16.3	14.6	22.4
Not LEP in the Year in Question	19.0	27.4	27.9

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated.

Exhibit 1.8

Percent of LEP Students Perceived versus Served as Limited-English Proficient, by Year: 3rd Grade Cohort (N=1,739)

	1991 (3rd grade)	1992 (4th grade)	1993 (5th grade)	1994 (6th grade)
Total Either Perceived or Served as LEP				
Perceived	56.4	52.7	45.1	42.3
Served	70.3	61.6	59.2	59.4
Relationship Between Perceived and Served				
Both Perceived and Served	49.9	44.2	40.6	36.5
Perceived Only	6.5	8.5	4.5	5.8
Served Only	20.4	17.4	18.6	22.9
Not LEP in the Year in Question	23.2	29.9	36.3	34.8

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated.

divides the LEP population for each year into four categories: students both perceived and served as LEP; those perceived but not served; those served but not perceived; and those not categorized as LEP at all in the year in question.

General Trends

As students move from little or no proficiency in English to the proficiency levels required to perform well in core curriculum courses conducted in English—typically developing understanding and oral proficiency more rapidly than proficiency in reading and writing—we would expect services criteria to be more important than teacher reports in identifying the total number of LEP students. This should be particularly true for students with higher levels of English proficiency.

As we saw in Exhibit 1.4 for the study period as a whole, Exhibits 1.7 and 1.8 show that in any given year the services criteria are more prominent in defining the LEP population than the perceptions criteria. For the 1st grade cohort, Exhibit 1.7 shows that the percent of the LEP population that meets the perceptions criteria ranges from 64.7 percent in the 1st grade to 49.7 percent in the 3rd grade, while the percentage that meets the services criteria ranges from 72.9 percent in the 1st grade to 64.4 percent in the 3rd grade. Similarly, Exhibit 1.8 shows 56.4 to 42.3 percent of the 3rd grade cohort meeting the perceptions criteria each year between 3rd and 6th grade, while the percentage meeting the services criteria ranges from 70.3 to 59.4 percent over the same interval. Within these ranges, receipt of LEP-related services has less of a downward trend over time than does perceived LEP status for both cohorts.

As with the overall percentages presented in Exhibit 1.4, the lower panels of Exhibits 1.7 and 1.8 indicate that the students in the LEP population are most likely to be in both the services and perceptions categories in any single year, or in neither category. Perceptions without services constitute the least common combination in any year, while services without perceptions are somewhat more common. Thus, as we saw in the aggregate data, perceptions and services coincide for most—but by no means all—LEP students in any given year.

Within these broad parameters, the share of students both perceived and served as LEP tends to decline over time. For the 1st grade cohort, the lower panel of Exhibit 1.7 shows a drop from 56.6 percent in the 1st grade to 42.0 percent in the 3rd grade, while for the 3rd grade cohort, Exhibit 1.8 shows a decline from 49.9 percent in the 3rd grade to 36.5 percent in the 6th grade. A possible reason why there is less agreement over time between perceptions and services is that, as students become more proficient in English, perceptions (and survey responses) about whether a student is LEP may become more ambiguous. There are no clear trends in the size of the other two categories of LEP students: those perceived but not served, and those served but not perceived.

Special Cases

These last two categories of students represent intriguing subsets of the LEP population. The lower panels of Exhibits 1.7 and 1.8 show that, in any year, from 4.5 to 8.5 percent of the students in the LEP population are *perceived by teachers or administrators as having limited English proficiency but receive no LEP-related services.*[29] That such a group exists is not surprising, given resource limitations in many schools and the need for a minimum number of LEP students at a particular grade level if special services are to be offered effectively and efficiently.[30] That it includes about one in every eight students perceived by school staff as having limited English proficiency in a given year has important policy implications,[31] but still confirms that most perceived LEP needs are being addressed (at least to some degree). This pattern remains fairly stable across grade levels, ranging from a high of one in six students with perceived needs receiving no reported services in the 4th grade, to a low of one in ten in the 5th grade.

As discussed in the earlier section on legal requirements for special services to LEP students, it is possible that a student may be accurately identified as LEP, but the school is not legally required nor inclined to provide special services. For example, while most public schools receive at least some federal funding, a school district that does not receive federal funding is not required to meet Title VI requirements for special assistance to LEP students and may choose to immerse the student in the standard EP curriculum at their school.

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[29] An earlier *Prospects* report found that the likelihood of receiving no LEP services was higher in schools with fewer LEP students (see Moss and Puma 1995, Exhibit A4.5).

[30] In Chapter 3 we consider the overall availability of LEP-related services at each grade level.

[31] The one-in-eight figure comes from comparing the percentage of LEP students categorized as "Perceived Only" in row 2 of the lower panels of Exhibits 1.6 and 1.7 with the sum of that row and the previous row.

There are several reasons related to the way the data were collected that could lead to over- or under-counts of the number of LEP students who are perceived as LEP but do not receive LEP-related services. The figures presented in Exhibits 1.4, 1.7, and 1.8 may *exaggerate* the extent of unmet need to the degree that:

- Abstracts from school records and other indicators of service receipt failed to identify special LEP-related services received by some of the students perceived as LEP;
- Primary teachers used an overly broad definition of limited English proficiency when completing the Student Profile; or
- Bilingual Spanish-English students with full English proficiency were at times tested in Spanish for the *Prospects* study and, thus, were categorized as LEP here, when in fact they did not need LEP-related services.

Conversely, it is possible though less likely that the estimates given here *understate* the degree of unmet need, if:

- School staff applied inappropriately narrow definitions of limited English proficiency in completing the Student Profile and in deciding which students should take the *Prospects* standardized tests in English; or
- Unmet needs for ESL or Bilingual Education were not recognized by school staff, or were no longer present when data on staff perceptions were collected in the Spring of each year (but were present earlier in the year).
- School staff may have low expectations for student levels of English proficiency in their school. The main *Prospects* study, for example, reports that grading expectations for academic performance were *lower* in high poverty schools (e.g., A-level work in poor schools was rated as C-level work in non-poor schools).

Somewhat more surprising is the significant share of LEP students *reported as receiving LEP-related services whom teachers and administrators did not report on the teacher survey as having limited English proficiency*. This group ranges from 14.6 to 22.9 percent of the overall LEP group in any year, or a little more than one in every three students reported as receiving

LEP-related services.[32] This pattern remains fairly stable across grade levels, ranging from a low of one in every 4.5 1st and 2nd grade students receiving services that have no perceived need, to a high of one in every 2.5 6th grade students.

How could so many of the students provided with ESL and Bilingual Education services be outside the group *perceived* as limited English proficient? The way the *Prospects* data were collected may figure into the explanation. For example, some of the students receiving LEP-related services early in the school year may no longer have been limited English proficient when we collected data on perceptions in the spring.[33] Or, they may have had limited English proficiency sufficient to justify services, but not so severe as to rule out English-language testing for *Prospects* or to cause their primary classroom teachers to categorize them as LEP. Conversely, it is possible that school records mistakenly indicate the receipt of ESL or Bilingual Education services when neither need nor services was present.

In addition to all of these data-related explanations, we must also consider the possibility that an important number of students, from 1.4 to 2.1 percent of the entire student body during the study years, received ESL and/or Bilingual Education services even though they were perceived by school staff as having little or no limited English proficiency.[34] Later chapters of the report shed some light on this vital question. For now, we reemphasize that the reported figures may substantially *exaggerate* the extent of services to students who are not limited English proficient because:

- Abstracts from school records cover, in part, a time period prior to that when perceptions of limited English proficiency were measured;

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[32] The one-in-three figure comes from comparing the percentage of LEP students categorized as "Served Only" in row 3 of lower panels of Exhibits 1.6 and 1.7 with the sum of that row and the first row of the panel.

[33] Data on ESL and Bilingual Education instruction abstracted from school records were intended to include services received *at any point during the current school year*, at least in the 1992, 1993, and 1994 rounds of data collection. The intention (and practice) is not so clear in 1991, when abstracted data may have picked up only *current* services. Even in that year (3rd grade for the 3rd grade cohort), 20.4 percent of the LEP group fell into the "Served Only" category (see row 3 of the lower panel of Exhibit 1.7).

[34] The 1.4 to 2.1 percent range is derived by multiplying the percent of LEP students in this category (from row 3 of the lower panels of Exhibits 1.6 and 1.7) by the share of the overall cohort classified as LEP (from Exhibit 1.2).

- Abstracts from school records—and other indicators of service receipt, such as association with a specific ESL or Bilingual Education teacher, or teacher reports of service receipt—may occasionally show services when none were received, due to data errors; or

- Limited English proficient students may have occasionally been tested in English (i.e., with the CTBS) and not identified as LEP by their primary teacher (perhaps due to survey nonresponse) even though they were (appropriately) receiving LEP-related services.

Each of these situations seems likely to have played some part in the reported data, particularly the first factor concerning the timing of data collection. Unfortunately, we have no way of gauging how much the three factors combined have skewed our measures of services without needs upward.

Conversely, the findings presented here may *understate* the extent of services to English proficient students. While less likely, this could occur if:

- Due to missing data, abstracts, teacher reports, and teacher associations failed to identify some of the students who received ESL or Bilingual Education services among those who were not perceived as LEP; or

- Test-taking patterns and teacher reports indicated that some of the students receiving LEP-related services had limited English proficiency when, in fact, they did not.

Neither of these situations—English proficient students whose service receipt was not reported, and English proficient students overlooked because they were misreported as LEP—seems likely to have occurred very often, making it likely that, on net, LEP-related services to EP students are somewhat exaggerated rather than under-reported in the available data.

LEP TRANSITIONS

In looking at the LEP population over time, students whose LEP classification changes during the period of observation form intriguing subgroups for further analysis. Those whose classification changes from "LEP" to "not LEP" are of obvious policy interest, since schools seek to increase the English proficiency of LEP students until they no longer fall into this category.

It is also important to understand why some students' classifications switch from "not LEP" to "LEP," since an important concern for these students is whether they should have been recognized as LEP and/or received LEP-related services in a prior year.[35] This section looks at the shares of the LEP population that experience each of these transitions, and at the individual criteria associated with exits and entrances from the "LEP" category.

Types of Transitions

Exhibit 1.9 shows the timing of exits from and entrances into the "LEP" category for both cohorts. The first column gives the percent of the LEP population that:

- Made no observed transitions into or out of the LEP group (i.e., was categorized as "LEP" in all observed years);
- Exited the "LEP" classification during the study period; or
- Entered the "LEP" classification during the study period.

It also indicates the year of transition in each case. Students whose classifications changed more than once are counted twice, once for each transition. For example, if a student's classification changed from "LEP" to "not LEP" in the 2nd grade then returned to "LEP" in the 3rd grade, s/he is counted in both of these rows.

The second and third columns of the exhibit show the extent to which multiple transitions occur. For example, the second column shows that 2.5 percent of the LEP population for the 1st grade cohort left the "LEP" category in the 2nd grade but returned to it in the 3rd grade. Most of the cells in the second and third columns do not contain any entries either because the category does not apply (e.g., those who enter the "LEP" classification cannot "Reenter Later") or because our data end before we have an opportunity to observe re-entrances or later exits (e.g.,

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[35] All students whose classification shifts from "not LEP" to "LEP" during the study period have been observed as "not LEP"—i.e., as neither perceived as LEP nor receiving LEP services—in at least one prior year. This does not mean, however, that they were neither recognized nor served as LEP in *all* previous years, since they may have been recognized and/or served prior to the advent of data collection. This is most likely—though still fairly unlikely—for students in the 3rd grade cohort, whose LEP classification in grades 1 and 2 was not observed.

Exhibit 1.9

Transition Patterns Among LEP Students, by Cohort

Cohort/Type of Transition	Total	Reenter Later	Exit Later
1st Grade Cohort (N=1,642)			
No Transitions (LEP in all observed years)	54.8	n/a	n/a
Exits			
In 2nd grade	14.9	2.5	n/a
In 3rd grade	15.5	n/a	n/a
Entrances			
In 2nd grade	6.5	n/a	4.2
In 3rd grade	15.0	n/a	n/a
3rd Grade Cohort (N=1,739)			
No Transitions (LEP in all observed years)	45.4	n/a	n/a
Exits			
In 4th grade	14.3	2.6	n/a
In 5th grade	13.0	2.0	n/a
In 6th grade	13.7	n/a	n/a
Entrances			
In 4th grade	7.6	n/a	6.3
In 5th grade	6.5	n/a	3.3
In 6th grade	15.2	n/a	n/a

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated.

students whose classification changed from "LEP" to "not LEP" in the 3rd grade cannot reenter later because we do not observe them for any more years).

Similar to Exhibit 1.3, the first column of Exhibit 1.9 shows that the LEP population is quite dynamic: only about half of the students in the LEP population remained in the LEP group throughout the study period.[36] The percentage without transitions is smaller for the 3rd grade cohort (45.4 percent) than the 1st grade cohort (54.8 percent) in part because there is an additional year of data for the former group. For both cohorts, 20 to 30 percent of all students categorized as "LEP" at some point during the study period underwent a change in their LEP classification in a given year.

The first column of the exhibit also shows that, in most years, a larger proportion of the overall LEP group exited the "LEP" category than entered it. This is consistent with the net outflow of LEP students over time shown in Exhibit 1.2. This tendency was not universal, however: the 3rd grade cohort showed more entrances than exits during the 6th grade year, a reversal that accounts for the small net increase in the size of the LEP group in the 6th grade (see Exhibit 1.2). It seems likely that anomalies in the 1994 data account for at least some portion of this increase, since 1994 data for the 1st grade cohort also show an unusually high percentage of entrances compared to exits.

The second and third columns of Exhibit 1.9 reveal two other important findings concerning multiple transitions in and out of the "LEP" category. First, the great majority of students who are initially classified as "LEP" and leave that group *are never returned to the "LEP" group during the study period.* For example, two-thirds of the students in the 3rd grade cohort who exited the "LEP" group in the 4th grade were not put back in that classification by the data in the 5th or 6th grades.[37] Second, the great majority of students that are not initially classified as "LEP" but who enter that group in the second or third year of observation *have been taken out of the "LEP" category again before the end of the study period.* For example, three-fourths of the students classified as entering the "LEP" group in the 2nd grade left that classification again in the 3rd grade.[38]

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[36] Our procedures for handling missing data may have affected this result to a slight degree. Missing data forced us to impute certain LEP criteria in particular years. (Appendix A provides details of the imputation procedures.) Since one goal of the imputation rules was to minimize transitions from or to LEP status, all reported transitions in Exhibit 1.8 are based on observed data. Additional transitions might also have occurred, in years with missing data; if so, the rates of transition shown in the exhibit understate the true extent of movement within the LEP population to some degree.

[37] This proportion is calculated as 1 - (4.6/14.3), where 14.3 refers to the percentage of the overall LEP population in the 3rd grade cohort that exited the "LEP" category in 4th grade, and 4.6 is the percent of that population put back in the "LEP" group in a later year of the study (i.e., in the 5th or 6th grade).

In sum, students who were initially categorized as "LEP" but later change classifications are likely to remain "not LEP" through the end of the observed data, while those who are first classified as "LEP" later in the study period are likely to leave that group again before the end of our observations. In both instances, there is a strong tendency for students whose LEP classification makes a transition to leave the "LEP" category before the study period ends.

Entrances into LEP Status

Based on the figures in Exhibit 1.9, we can infer that less than 1 percent of all public elementary school students move from a classification of "not LEP" to classification of "LEP" each year between the 2nd and 6th grades.[39] As noted earlier, most of these entrances are transitory. Others may reflect random variations in the measured data that occasionally but inevitably arise in longitudinal data sets. Still, the group as a whole is important: apparently, some number of students meet teachers' English proficiency standards and get no special LEP services in one year, then fail to meet those standards or start to receive special services (or both) the next year.[40]

Several different factors could account for switches in LEP classification of this kind, some more likely than others:

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[38] This proportion is calculated as 4.2/6.5, where 6.5 is the percentage of the overall population in the first grade cohort classified as leaving the "LEP" group in the second grade, and 4.2 is the percentage of that population that was taken out of the "LEP" category later in the study period (i.e., in the third grade).

[39] This estimate is the midpoint of the range that can be calculated from numbers in Exhibits 1.2 and 1.9. This range is derived by multiplying the percent of the overall LEP population that enters the "LEP" classification in each year (from the first column of the entrances panels of Exhibit 1.9) times the percent of students meeting our criteria for coding as LEP in any one of the study years, by cohort (from Exhibit 1.2), producing figures between 0.6 percent and 1.3 percent.

[40] LEP students are concentrated in the elementary grades, so this number is likely to be smaller for higher grade levels.

- Some students may have high enough levels of English proficiency that there is some ambiguity about whether to provide special services or whether they have limited proficiency in English;
- Even for students whose proficiency in English is clearly limited, there may be administrative discretion (that varies from year to year) in categorizing them as LEP or providing special services;
- To the extent that service receipt alone defines the LEP population absent perceptions of limited English proficiency, a student could enter the "LEP" classification when previously unavailable LEP services become available the next school year or at a higher grade level;
- As the English language skills required for classroom performance grow with successive grade levels, schools may apply progressively more stringent standards to identify students as LEP at higher grade levels;
- An absolute decline in a student's English language ability could occur from year to year; or
- Over time, a school may have raised its standards for English proficiency (and perhaps for other instructional outcomes).

We found support for the first possibility: students entering our LEP category after the first year tend to have higher levels of English proficiency. Late entrants were twice as likely as other LEP students to be rated by their primary teacher as having excellent proficiency in understanding, speaking, reading, and writing English. Late entrants were also more likely to be classified as non-LEP in the following year relative to students identified as LEP from all previous years of data, further evidence that the former group are "borderline" cases.[41] On the other hand, half of the late entrants were identified as having less than excellent English proficiency by their primary teacher, an indication that special language related services would be appropriate.

The second and third factors above also seem like plausible explanations for late entrants, and may have important implications for how schools serve LEP students.

While we cannot distinguish among these various scenarios, we can consider the *reasons* students are included in the "LEP" category following a year in which they did not meet any of the eight LEP criteria. Exhibit 1.10 shows the specific criteria met in each year of LEP entry, by cohort.[42] Multiple criteria are reported for some students, leading to percentages that sum to more than 100 though, not surprisingly, most of the students newly classified as "LEP" met just one of the eight criteria in the year of entry.[43]

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[41] Late entrants were also more likely than other LEP students to: be in schools with lower concentrations of LEP students; take the English version rather than the Spanish version of standardized tests; and have higher average standardized test scores.

In general, perceptions of limited English proficiency and receipt of LEP-related services are both important in moving a previously "not LEP" student into the "LEP" category. As seen in the first row of each of the panels of Exhibit 1.10, more students enter the "LEP" subgroup by being identified by their teacher as LEP or receiving ESL or Bilingual Education instruction, as reported in school records, than by any other means. These two factors—a change in teacher perceptions from one year to the next, and the beginning of supplemental services for students not previously categorized as LEP—each account for 25 to 57 percent of LEP entries at each grade level. In part, changes in LEP classification for the latter reason may reflect changes in the availability of ESL services across different school years and grade levels. Similarly, the change in primary teacher that almost accompanies movement from grade to grade—combined with differences among teachers in English proficiency standards—could account for a good many of the LEP entries attributable to changes in teacher perceptions.

Not nearly as many students enter the "LEP" category through changes in the other six indicator variables. Most common are those whose status changes because their teachers report that they received services of an unspecified type because of limited English proficiency (see last row of the exhibit), a factor which contributes to 13 to 49 percent of all entries into the "LEP" classification. The other five criteria play much smaller roles in the transition into "LEP" status, and variations in importance among the factors by grade level show no obvious patterns.

Whatever their origins, the movement of students from a year classified as "not LEP" to a year classified as "LEP" makes an important contribution to the long-term dynamics of the LEP

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[42] Percentages in Exhibit 1.9 (and Exhibit 1.10 which follows) are rounded to the nearest percentage point to avoid spurious precision. The samples used here—LEP entrants and exits—are much smaller (145 to 381 students) than those analyzed earlier in the chapter.

[43] No data are available on the final criterion, association with a non-Chapter 1 ESL or bilingual education teacher, for 1994 entrants.

Exhibit 1.10

Criteria Associated with Entrances into LEP Status, by Cohort and Year

	1st Grade Cohort		3rd Grade Cohort		
	Entered in 1993 (2nd grade)	Entered in 1994 (3rd grade)	Entered in 1992 (4th grade)	Entered in 1993 (5th grade)	Entered in 1994 (6th grade)
Number of LEP entrances (unweighted)	116	100	172	140	171
(Weighted) percent of LEP entrants with positive indicators for:					
Perceived as LEP					
Identified as LEP by teacher	48.3	31.7	28.5	42.8	42.0
Took Spanish-language test (SABE)	0.9	0.0	3.2	0.0	0.0
Identified by school as LEP for purposes of *Prospects* standardized achievement test	3.0	0.5	13.0	7.5	0.1
Received LEP Services					
Recipient of ESL or Bilingual Education instruction, from school records	45.6	24.9	27.5	43.1	57.3
Recipient of ESL instruction, as classified by primary teacher	17.6	0.8	7.3	5.2	10.1
Recipient of Bilingual Education instruction, as classified by primary teacher	13.9	1.9	5.8	11.4	11.4
Associated with a non-Chapter 1 ESL and/or Bilingual Education teacher	11.5	n/a	19.9	10.5	n/a
Recipient of unspecified services due to limited English proficiency, as classified by primary teacher	12.7	48.9	13.4	31.4	26.0

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated.

population. Without this partial offset to exits from the "LEP" group, the proportion of students classified as LEP would decline much more sharply by grade level than shown in Exhibit 1.2.

Exits from LEP Status

The figures in Exhibit 1.9 consistently show that between 13 to 15 percent of LEP students in elementary school move from a classification of "LEP" to a classification of "not LEP" by the following year. Since there are more LEP students in the earlier grades, this translates into 1.1 percent of public school students moving from LEP to not LEP between 1st and 2nd grades (about 41,000 students), and 0.8 percent of all public school students moving from LEP to not LEP between 5th and 6th grades (about 23,000 students), based on our criteria for identifying students as LEP. This represents an important amount of progress in addressing the English language needs of non-native English speaking students in the U.S. public school system. As noted earlier, most exits from the LEP category are permanent, at least within the confines of the study period: at most one in five of the students who leave LEP status return to it during the next 1 or 2 years.

Perhaps the most obvious reason that students would leave the "LEP" category defined by our data is improvement in English language skills; this, after all, is the central purpose of LEP services. However, as with entrances, some recorded exits may be due to random variations in the measured data. Other reasons for leaving the "LEP" group involve real changes in the school's—as opposed to the student's—situation, including:

- Administrative discretion in categorizing or serving students as LEP from year to year;
- A decrease in the school's LEP standards; and
- Decreases in the extent of LEP services offered in a particular year or grade level.

As with our earlier examination of the reasons students entered our LEP category following a year they did not meet any of the eight LEP criteria, we can examine the proximate reasons for exiting our LEP category by considering the LEP criteria met in the year prior to exit (see Exhibit 1.11). Many students met multiple criteria in the year prior to exit (an average of

Exhibit 1.11

Criteria Associated with Exits from LEP Status, by Cohort and Year

	1st Grade Cohort		3rd Grade Cohort		
	Exited in 1993 (2nd grade)	Exited in 1994 (3rd grade)	Exited in 1992 (4th grade)	Exited in 1993 (5th grade)	Exited in 1994 (6th grade)
Number of LEP exits (unweighted)	165	278	210	290	294
(Weighted) percent of LEP exiters with positive indicators in the year prior to exit for:					
Perceived as LEP					
Identified as LEP by teacher	32.6	44.4	28.9	41.0	41.2
Took Spanish-language test (SABE)	0.4	2.5	2.5	0.5	5.9
Identified by school as LEP for purposes of *Prospects* standardized achievement test	14.1	3.4	4.9	16.6	4.0
Received LEP Services					
Recipient of ESL or Bilingual Education instruction, from school records	54.4	55.0	48.5	48.1	53.3
Recipient of ESL instruction, as classified by primary teacher	16.1	15.7	21.0	19.5	30.7
Recipient of Bilingual Education instruction, as classified by primary teacher	8.6	13.8	16.7	12.8	16.8
Associated with a non-Chapter 1 ESL and/or Bilingual Education teacher	24.5	20.0	27.4	19.9	18.3
Recipient of unspecified services due to limited English proficiency, as classified by primary teacher	24.7	15.2	8.5	15.7	20.3

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated.

1.4 to 1.8 criteria, depending on the year), leading to percentages in the exhibit that sum to substantially more than 100. In part for this reason, a wider range of criteria account for noticeable shares of the LEP exits than was true of LEP entrances.

Unlike entrances, receipt of LEP services plays a visibly larger role in explaining exits from our LEP definition than do staff perceptions. The single most common reason for exit is the discontinuance of ESL or Bilingual Education instruction as reported in school records: 48 to 55 percent of all exits from our LEP definition followed a year in which services were reported using this measure. The next most important factor accounting for exits is teacher identification: 29 to 44 percent of the students who cease to meet any LEP criteria in a given year were classified by their teacher in the previous year as having limited English proficiency. It is not surprising that removal of these two criteria—school records of services and teacher perceptions—leads to a large share of LEP exits, since the same two criteria are also the most common reasons for classification as "LEP" in the first place (see Exhibit 1.5).

All of the other measures of service receipt play a smaller but non-trivial role in moving students out of our LEP category.[44] The remaining two indicators that school staff perceive a student to be LEP, having the student take the Spanish-language version of the *Prospects* tests or the judgement that the student's English proficiency is not sufficient to take the tests, are rarely present as LEP indicators the year before a student exits our LEP category. There any obvious patterns across grade levels in the relative importance of the different LEP factors in accounting for LEP exits.

Overall, about 30 percent of all students categorized as LEP at some point in the observation period were no longer classified as "LEP" at the end of data collection (see Exhibits 1.7 and 1.8, final row and column). This does not mean that 30 percent of students categorized as LEP achieved English proficiency at the end of the study period, or that 70 percent were not English proficient. Exits from LEP status depend not just on proficiency standards (which can differ from school to school) but also on the types of programs and language-related services that school offer. In addition to test-based proficiency measures which typically measure general language skills, exiting also depends on the ability of a student to succeed in learning *curriculum content* in classrooms where all instruction is in English. Curricula differ on how quickly they are designed to transition students into completely English language classrooms, and the transition may not be related to improvements in English proficiency. For example, a transitional bilingual education program strives to teach students English so that they can attend classes taught only in English as soon as possible. These programs typically take two to three years before the transition is made. On the other hand, developmental bilingual education programs strive to build proficiency in both English and students' first language, and students may be in these programs for a longer period of time.

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[44] One of the eight LEP criteria—association with a non-Chapter 1 ESL and/or bilingual education teacher—is not available in the 1994 data. As a result, every student classified as leaving the "LEP" category in 1994 and who met this criterion in 1993 is counted in Exhibit 1.10 as having this factor associated with exit. Even so, the percentage of LEP students exiting for this reason is generally lower in 1994 than in other years, suggesting that the omission of this variable has little effect on the tendencies discussed here.

Other research (e.g., Thomas and Collier 1997, Ramirez 1991, and DeAvila 1997) suggests that it takes five to seven years for a student to acquire proficiency in a second language (as measured by performing at or above the 50th percentile on standardized tests in English),[45] which is consistent with our finding that most students identified as LEP remain classified as LEP for the three or four years (depending on cohort) of the *Prospects* study. That research also cites school-level influences on academic success for LEP students, including "cognitively complex on-grade-level academic instruction" in students' first language or in English.

DEFINING LEP GROUPS AND COMPARISON GROUPS FOR FURTHER ANALYSES

Understanding the size and dynamics of the LEP population is important as background to later analyses of LEP student characteristics, services, and outcomes. It also provides a basis for deciding how best to subdivide the student population when comparing LEP and English proficient students on these factors. Based on the above analysis, we propose to focus the remainder of the report on two primary comparisons:

- Students observed as LEP at some point in the follow-up period, compared with those who are not, for the 1st grade cohort; and

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[45] The same research finds that students with at least two years of native language instruction in their home country acquire English proficiency more quickly than students with no native language instruction.

- Students observed as LEP at some point in the follow-up period, compared with those who are not, for the 3rd grade cohort.

Most of the questions surrounding limited English proficient students in U.S. public schools focus on the first of the two populations in each comparison. These are the students who at some point during their grade school years are known to have met one or more of the eight LEP service or perception criteria developed here. Even defined this broadly, the population of interest constitutes only around 9 percent of the entire student body (see Exhibit 1.12).

For many purposes, it will be useful to contrast LEP students with the rest of the students in their cohort, as was done in the previous LEP report based on *Prospects* data (see Puma and Moss, 1995). The sharpest contrasts can be drawn by excluding LEP students from the comparison sample and comparing mutually exclusive "LEP" and "not LEP" subpopulations. In some of our analyses, we will further fine tune the comparison groups by contrasting LEP and EP students from low-income families. We define low-income families as families with an average annual family income less than 185 percent of the poverty level, adjusted for family size (see Exhibit F.1 for sample sizes). The estimates for students from families with higher incomes will also be shown for completeness. For other analyses, such as the comparison of the quality and type of educational services provided to students, we will compare LEP students at high-poverty schools to EP students at high-poverty schools (see Exhibit 2.32 for sample sizes). A high-poverty school is defined as a school where over half of the students are eligible for free or reduced-price school lunches. Again, we also present the estimates for students from lower-poverty schools for completeness.

It will also be useful at times to contrast students who, based on the *Prospects'* LEP indicator variables, are identified as being LEP in the early period of the study and as English proficient in the later period of the study, to the other LEP students: to use our earlier terminology, to contrast LEP "exiters" to those who do not exit. This juxtaposition—as well as a three-way comparison of exiters, LEP, and English proficient students—will help to illustrate the varied experiences of LEP students.

In contrast, we will combine students who *enter* the "LEP" classification and remain there throughout the observation period with those who are classified as "LEP" throughout for

Exhibit 1.12

Population Shares and Maximum Sample Sizes for LEP Subgroups, by Cohort

	LEP at Some Point			
	Remain LEP	Exit LEP	Total	Never LEP
Population Shares (weighted):				
1st Grade Cohort	6.5	2.8	9.3	90.7
3rd Grade Cohort	5.1	3.5	8.6	91.4
Maximum Sample Sizes (unweighted):				
1st Grade Cohort	1,199	443	1,642	7,598
3rd Grade Cohort	975	764	1,739	7,771

comparison purposes. Like those who do not exit during the study period, these "enterers" were in the LEP population when last observed and, therefore, could exhibit many of the same characteristics. They also form a subgroup too small to analyze separately.

Exhibit 1.12 shows the population shares and potential sample sizes for each of the three LEP subgroups that emerge from this framework, by cohort. It also indicates the dimensions of the overall split between the LEP and English proficient students, which we would expect to provide the foundation for most of our analyses. As can be seen, each of the desired subgroups represents an important—though sometimes small—component of the overall student population.

It should also be noted that the sample sizes shown in the exhibit represent the *maximum* number of individuals in each subgroup that could be available for analysis. Instrument and item nonresponse will reduce these counts somewhat. Fortunately, oversampling of heavily language-minority schools provides fairly large LEP samples as a starting point, allowing us to isolate most of the populations shown in the exhibit.

CHAPTER 2

THE CHARACTERISTICS OF LEP STUDENTS AND THEIR FAMILIES

This chapter focuses primarily on demographic and other characteristics of LEP students and their families, and addresses a key research question: what resources—defined broadly—do LEP students bring with them to school? The background of LEP students is the starting point for schools. Because home resources are likely to influence educational outcomes for LEP students, understanding this background is important to understanding the challenges that schools face in achieving positive outcomes for LEP students. To provide a more complete picture of LEP students' background, however, we include in this chapter a brief examination of the extent to which LEP students attend schools that are high-poverty and have high concentrations of LEP students.

For purposes of this chapter, resources are broadly defined to include not just economic factors but also language background, home supports, parent involvement and expectations, student attitudes and self-perceptions, and school mobility, because all these factors may influence educational outcomes.

Other Research on LEP Students' Characteristics

Very few attempts have been made to get a nationally representative picture of the characteristics of LEP students and their families, and none have looked at as broad a range of characteristics as in the *Prospects* study.[1] Much of the debate on LEP students and outcomes has focused on data from cross-sectional sources and aggregate data that does not allow adequate analysis of student instruction and outcomes. Because it is nationally representative and longitudinal, *Prospects* is valuable both in providing new information about LEP students and potentially for policy improvement.

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[1] Two of the most ambitious recent studies of LEP and language minority students are Burkheimer, et al. (1989) and Ramirez et al. (1991).

Overview of this Chapter

For most of the analysis in this chapter we compare low-income LEP students to low-income English-proficient (EP) students, to get a sense of the extent to which LEP students differ from their economic peers. We begin the analysis, however, by examining characteristics for which such a comparison is less relevant; i.e., race, native language, geographic distribution, and language proficiency. These results provide the most basic picture of LEP students in the U.S.: what schools they go to, where they are from, where they live, and how well they speak both English and their native language. The second section in this chapter addresses the issue of how low-income LEP students differ from low-income English proficient students. We address this question on a number of dimensions, including income, parent education and employment, family structure, parent involvement and expectations, student attitudes and self-perceptions, and school mobility. These results demonstrate the extent to which LEP students are more disadvantaged than EP students in similar economic circumstances. The third section in this chapter provides a school-level perspective, showing the extent to which LEP students attend high-poverty schools and schools with high concentrations of LEP students. The chapter ends with a brief summary of key findings.

As in every chapter in this report, the primary sample of interest is students who are categorized as LEP in any year of the observation period. In this chapter we further focus many of our findings on the subset of the primary sample of LEP students who are in low-income families (families with an average annual family income less than 185 percent of the poverty level, adjusted for family size), which includes about 85 percent of all LEP students. This allows us to disentangle, at least partly, the characteristics associated with limited English proficiency from the characteristics associated with low income.

All tabulations in this chapter are based on population weights. These weighted tabulations provide a nationally representative picture of both LEP students and all public school students.

As in most of this report, missing data have been imputed for the variables used in this chapter. Appendix D describes the imputation process.

THE CHARACTERISTICS OF ALL LEP STUDENTS

This section provides a basic description of the entire LEP population, for characteristics that are especially relevant to LEP students. In the subsequent section we focus on low-income LEP students and how they differ from low-income EP students, but it is helpful to start with a basic picture of the entire LEP population.

Ethnicity and Native Language Characteristics

As can be seen from Exhibit 2.1, the vast majority of LEP students in our sample—i.e., students who this study defines as LEP in at least one year of the study—are Hispanic. Across both the 1st and 3rd grade cohorts, nearly three-fourths of all LEP students are of Hispanic origin. The second-largest ethnicity among LEP students is Asian, representing more than one-tenth of the LEP population across each of the 1st and 3rd grade cohorts. White and Black non-Hispanic LEP students constitute relatively small portions (approximately seven and five percent, respectively) of the LEP population.[2] The racial/ethnic distributions of LEP students across cohorts are very similar. The preponderance of LEP students of Hispanic origin means that most of the findings for LEP students in this report hold also for Hispanic LEP students.[3]

The distribution of native languages among LEP students closely follows the distribution of LEP student ethnicities. Exhibit 2.2 shows that Spanish is the native language for nearly 75 percent of LEP students, and Asian languages (Chinese, Japanese, Korean, Filipino, Vietnamese, other Asian) together comprise about 13 percent of LEP students' native languages.

Geographic Distribution

LEP students in the United States are largely concentrated in the West and South; together these regions include 80 percent of LEP students. (The regions in this study follow the U.S. Census Bureau definitions. Exhibit B.1 in Appendix B lists the states in each Census region.)

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[2] Data collected from schools do not include country of origin for white LEP students and black, non-Hispanic LEP students.

[3] Because there is no other racial/ethnic group of sufficient size in our sample, findings presented in this report by race/ethnicity are only presented for Hispanic and Asian students.

Exhibit 2.1

Race/Ethnicity of LEP and All Other Students

Cohort and Race/Ethnicity	Percent of All LEP Students	Percent of All Other Students
1st Grade Cohort	(N=1,642)	(N=7,598)
Hispanic	73.0%	7.4%
Asian	11.5	1.7
White, non-Hispanic	7.4	70.5
Black, non-Hispanic	4.5	15.5
Other	3.7	4.9
Weighted Sample Size	333,961	3,252,460
3rd Grade Cohort	(N=1,739)	(N=7,771)
Hispanic	72.2%	5.7%
Asian	12.0	2.6
White, non-Hispanic	6.5	74.5
Black, non-Hispanic	5.0	13.7
Other	4.3	3.4
Weighted Sample Size	265,689	2,816,501

Exhibit 2.2

Native Language for All LEP Students

Cohort and Language	Weighted Sample Size	Percent of All LEP Students
1st Grade Cohort (N=1,642)		
Spanish	248,590	74.4%
Southeast Asian	15,998	4.8
Chinese or Japanese	10,304	3.1
Korean	3,995	1.2
Filipino	3,459	1.0
Other Asian	12,785	3.8
Other	38,830	11.6
Total	333,961	100.0
3rd Grade Cohort (N=1,739)		
Spanish	196,306	73.9%
Southeast Asian	11,483	4.3
Chinese or Japanese	5,469	2.1
Korean	5,173	2.0
Filipino	2,556	1.0
Other Asian	8,947	3.4
Other	35,755	13.5
Total	265,689	100.0

As Exhibit 2.3 shows, in both cohorts the great majority of LEP students are in the West and South regions. About 85 percent of all LEP students live in the West or South, with about half of all LEP students in the West region alone. Slightly more than 10 percent of the LEP student population lives in the Northeast region, while only about five percent lives in the Midwest region.[4]

Broken out by ethnicity, the regional distribution of Hispanic LEP students is quite similar to the regional distribution for all LEP students, as shown in Exhibit 2.4. This is not surprising given that Hispanic students make up about three-fourths of the LEP sample. The residence of Asian students, however, is more evenly distributed across regions, with the West still being the largest, and the South and Northeast having a roughly equal share across cohorts.

Exhibit 2.5 shows the five states in our sample with the largest share of LEP students. Although the sample is nationally representative by region, it is not nationally representative by state, because not all states were included in the study sample. Therefore the exhibit presents unweighted numbers. It is nevertheless useful to know where the majority of the LEP students in our sample live. Overall, California accounts for close to 20 percent of the LEP students in this study, with another 12 percent living in Texas. New York, Pennsylvania and Georgia also had significant—albeit much smaller—LEP concentrations. Within each cohort, these five states with the most LEP students account for about half of all the (unweighted) LEP students in the study.

In terms of urbanicity, LEP students are somewhat more likely to attend urban than suburban schools, and only a small fraction attend schools in rural areas. Exhibit 2.6 shows that, across cohorts, slightly more than half of the LEP population lives in urban areas, a little over 40 percent live in suburban areas, with only about five percent in rural areas. Compared to other public school students, LEP students are much more likely to attend urban schools. Because urban schools tend to have higher levels of poverty and violence, their urban concentration means that LEP students face an additional educational disadvantage beyond their limited English proficiency.

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[4] Compared to all other students in the sample (i.e., English proficient students), LEP students are more likely to be located in the West and less likely to be located in the other three regions.

Exhibit 2.3

Regional Distribution of LEP and All Other Students

Cohort and Region	Percent of All LEP Students	Percent of All Other Students
1st Grade Cohort	(N=1,642)	(N=7,598)
West	54.7%	23.3%
South	30.2	38.5
Northeast	10.1	20.3
Midwest	5.0	17.9
Weighted Sample Size	333,961	3,252,460
3rd Grade Cohort	(N=1,739)	(N=7,771)
West	53.0%	21.0%
South	30.1	36.3
Northeast	12.8	21.9
Midwest	4.2	20.8
Weighted Sample Size	265,689	2,816,501

Exhibit 2.4

Race/Ethnicity of All LEP Students by Region

Cohort and Race/Ethnicity	Percent of Students in West	Percent of Students in South	Percent of Students in Northeast	Percent of Students in Midwest
1st Grade Cohort (N=1,642)				
Hispanic	75.3%	81.9%	51.7%	36.7%
Asian	9.1	4.8	31.8	36.4
Other LEP	15.6	14.3	17.5	26.9
3rd Grade Cohort (N=1,739)				
Hispanic	86.5%	61.9%	49.3%	34.9%
Asian	9.0	11.5	16.2	40.9
Other LEP	5.5	27.6	34.5	24.2

Exhibit 2.5

Distribution of LEP Students by State, for States With Largest Share of LEP Students in Sample, Unweighted

Cohort and State	Percent of All LEP Students, Unweighted
1st Grade Cohort (N=1,642)	
California	18.5%
Texas	10.9
New York	6.7
Pennsylvania	5.5
Georgia	5.0
Total	46.6
3rd Grade Cohort (N=1,739)	
California	19.8%
Texas	13.4
New York	7.8
Pennsylvania	6.4
Georgia	4.4
Total	51.8

Note: Data are based on students' locations in 1991.

Exhibit 2.6

Urbanicity of LEP and All Other Students

Cohort and Urbanicity	Percent of All LEP Students	Percent of All Other Students
1st Grade Cohort	(N=1,642)	(N=7,598)
Urban	46.1%	24.2%
Suburban	48.1	36.1
Rural	5.9	39.8
Weighted Sample Size	333,961	3,252,460
3rd Grade Cohort	(N=1,739)	(N=7,771)
Urban	59.8%	23.6%
Suburban	34.9	37.2
Rural	5.3	39.2
Weighted Sample Size	265,689	2,816,501

Language Proficiency

This section examines the native and English language proficiencies of LEP students in the earliest available year of our study, and the English language proficiency of their parents.[5] (Students' English language proficiency is also a key outcome examined in Chapter 4.) These variables are indicators of the language "resources" of LEP students at the earliest point of observation in this study. Higher levels of English proficiency at a point in time mean students are that much closer to becoming fully proficient in English. Greater native language proficiency may provide a cognitive base for acquiring a second language and, other things equal, may be positively associated with academic achievement (Bankston and Zhou 1995). Finally, parents with greater English proficiency may be better able to help their children acquire English language skills.

Students' Native Language Proficiency. Teachers were asked to characterize students' proficiency in their native language along four domains of increasing complexity: *understanding, speaking, reading, and writing*. Survey questions on the reading and writing abilities of first graders and other young students tap general perceptions of readiness to read and write as well as the actual performace for those few students who do read or write at some level at those ages. Despite this constraint, the questions provide a rough measure of readiness to learn and performance in those areas.

Using teachers' assessments is perhaps the simplest approach to assessing native language proficiency. A disadvantage of this approach is that it relies on the subjective judgements of a large number of teachers, which clouds comparisons across students. That is, teachers may have used different comparison groups in answering the language ability questions; teachers may have compared LEP students to other LEP students, to all other students in their classroom, or to students in other grades. Further, many of these teachers are likely not proficient in students' native languages, which makes it difficult to assess proficiency accurately.[6] Although these assessments must be interpreted with caution, they may be useful as rough benchmarks of students' native language proficiency, and as measures of how teachers view LEP students' native language proficiency. (See Appendix I for a detailed analysis of the validity of teacher judgements of English proficiency.)

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[5] For the 1st grade cohort the earliest point of observation is the spring of 1992, which is the end of the 1st grade. Only test score data were collected for this cohort in 1991 (in the fall). For the 3rd grade cohort the earliest point of observation is the spring of 1991, which is the end of the 3rd grade.

As shown in Exhibit 2.7, although about 50 to 60 percent of LEP students across both cohorts are judged by their teachers to have good or excellent proficiency in understanding and speaking their native language, proficiency in reading and writing is much lower. Only about 20 percent of LEP students in the 1st grade cohort, and 25 percent in the 3rd grade cohort, are judged to have good or excellent proficiency in reading or writing their native language. This may be because some LEP students emigrated to the U.S. when they were very young, so they did not have enough time to master their native language. It may also be that teachers are unlikely to characterize students this young as having mastered any language, especially not in terms of reading and writing. Averaging across the four skills, more than one-fourth of the LEP students in both cohorts are judged to have poor or no native language proficiency, which may be expected to impede their acquisition of English proficiency, other things being equal (Thomas and Collier 1997, Ramirez 1991, De Avila 1997, and Cummins 1981).

Comparing LEP students' native language proficiency across cohorts could in principle show whether native language proficiency tends to improve or decline with age. Other research suggests that, on average, native language proficiency may decline with age, especially if students' native language skills are not developed in school (Wong Fillmore 1991).

But a cross-cohort comparison is complicated by the possibility of a compositional difference between the two cohorts. Every year some students exit LEP status. If the students who exit LEP status by the end of first or second grade tend to have relatively weaker native language proficiency (and relatively stronger English proficiency), then students who remain LEP in third grade might have stronger native language proficiency on average than students who are

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[6] An analysis based on data from the 1988 National Education Longitudinal Study of 1988 found that teachers are less likely to identify students as being language minority than are the students themselves (U.S. Department of Education 1992). It is unclear, however, what effect this tendency might have on teacher assessments of students' native language *proficiency* See also U.S. Department of Educ[illegible]tion 1997.

Exhibit 2.7

Teacher Assessments of Native Language Proficiency for All LEP Students

	Percent of Students Whose Proficiency is Judged to Be:				
Cohort and Language Skill	Excellent	Good	Fair	Poor	No Proficiency
1st Grade Cohort (N=1,642)					
Understanding	21.0%	35.4%	20.3%	1.9%	21.5%
Speaking	18.3	29.3	24.3	6.2	22.0
Reading	7.0	14.7	31.0	18.8	28.5
Writing	5.5	13.3	27.5	23.5	30.2
3rd Grade Cohort (N=1,739)					
Understanding	20.3%	40.4%	20.1%	6.8%	12.4%
Speaking	15.1	39.7	24.9	8.0	12.3
Reading	8.4	22.0	33.3	16.0	20.4
Writing	4.3	18.7	32.0	23.7	21.3

Note: Data are for 1st grade (1992) for the 1st grade cohort and 3rd grade (1991) for the 3rd grade cohort.

LEP in the first grade. If so, we would expect that the 3rd grade cohort LEP students would have greater native language proficiency in the third grade than 1st grade cohort LEP students in the first grade.[7]

In fact the data show this pattern: LEP students in the 1st grade cohort are more likely to be judged as having no proficiency in their native language, compared to the 3rd grade cohort. An alternative explanation to the compositional effect just advanced is that native language skills may tend to improve over time, at least in the early elementary years. This could occur through native language instruction in school, or through use of the native language at home.[8]

Teacher assessments of native language proficiency are fairly similar for Hispanic and Asian LEP students, as shown in Exhibit 2.8, except that slightly more Hispanic students are judged to have good or excellent native language proficiency. One way in which this might occur is if Hispanic students are more likely to live in ethnically homogeneous neighborhoods. For the most part, though, in the view of their teachers, both Hispanic and Asian LEP students bring about the same level of native language skills to school.

Students' English Language Proficiency. Teachers were asked to assess students' English language proficiency in the same way as native language proficiency, judging separately on the domains of understanding, speaking, reading, and writing.[9] Exhibit 2.9 shows that, consistent with other research on second language acquisition, proficiency in understanding and speaking precedes proficiency in reading and writing. (See for example D'Avila 1997. This same pattern holds for native language proficiency, as shown earlier in Exhibit 2.7.) Exhibit 2.9 also shows that teachers generally judge LEP students to be more proficient in English than in their native language. (See Exhibit 2.7 for comparison.) For example, over 40 percent of the LEP students in each cohort were rated as having good or excellent proficiency in writing

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[7] Another reason why 3rd grade cohort LEP students might have greater initial native language proficiency is if they are on average more recent immigrants to the U.S.

[8] The native language proficiency of 3rd grade cohort LEP students appears to improve slightly from 3rd grade to 4th grade. In third grade about 37 percent of LEP students are judged to have good or excellent native language proficiency, and in fourth grade the corresponding figure is 42 percent.

[9] Appendix I examines in detail the validity of teacher judgements of students' English proficiency.

Exhibit 2.8

Teacher Assessments of Native Language Proficiency of LEP Students, By Race/Ethnicity

	Percent of Students Whose Overall Native Language Proficiency is Judged to Be:				
Cohort and Race/Ethnicity	Excellent	Good	Fair	Poor	No Proficiency
1st Grade Cohort (N=1,642)					
Hispanic	9.4%	23.7%	37.7%	12.7%	16.5%
Asian	2.8	22.5	41.4	24.1	9.2
Other	1.3	4.7	28.7	6.3	59.0
3rd Grade Cohort (N=1,739)					
Hispanic	9.7%	35.0%	36.6%	11.3%	7.5%
Asian	5.1	24.5	60.5	3.6	6.3
Other	1.8	4.0	17.1	30.7	46.4

Notes: (1) Overall language proficiency is an average of teacher assessments of proficiency in understanding, speaking, reading, and writing. (2) Data are for 1st grade (1992) for 1st grade cohort and 3rd grade (1991) for 3rd grade cohort.

Exhibit 2.9

Teacher Assessments of English Language Proficiency for All LEP Students

	Percent of Students Whose Proficiency is Judged to Be:				
Cohort and Language Skill	Excellent	Good	Fair	Poor	No Proficiency
1st Grade Cohort (N=1,642)					
Understanding	33.9%	39.5%	20.1%	4.6%	2.0%
Speaking	29.5	35.6	25.2	6.5	3.2
Reading	28.6	16.0	21.1	18.6	15.7
Writing	27.3	14.3	20.8	17.3	20.3
3rd Grade Cohort (N=1,739)					
Understanding	37.9%	33.5%	19.4%	7.3%	2.0%
Speaking	33.0	32.2	20.2	11.7	3.0
Reading	29.7	21.2	23.5	14.7	10.9
Writing	26.4	16.4	23.4	19.5	14.3

Notes: Data are for 1st grade (1992) for the 1st grade cohort and 3rd grade (1991) for the 3rd grade cohort.

English, compared to approximately 20 percent with good or excellent proficiency in writing their native language.

This provides a rough benchmark of the student's knowledge of her home language. Since many of these LEP students have had little or no formal education in that home language, it is not surprising that many have little or no proficiency in reading or writing that language. Since many teachers in the survey have little occasion to interact with the child in the child's mother tongue (and many of the surveyed teachers have little or no proficiency in the child's language), the teacher survey response should be taken as a rough benchmark for estimating these language skills. Analyses of survey results suggest that there are often considerable measurement errors in survey reports by teachers and others of a child's language background.[10] Finally, as noted at other points in this report, while a child may have limited knowledge of her mother tongue, she *may still benefit from support in English language classrooms* because her knowledge of the English language skills required to understand what is taught and to successfully complete assignments in English is often limited.

There is little difference in the proficiency patterns for the 1st and 3rd grade cohorts, which supports the possibility of a composition effect, as discussed earlier. We expect English language proficiency to improve over time, so the fact that the 1st and 3rd grade cohorts are similar suggests that the LEP students in the 3rd grade cohort may have started 1st grade with lower levels of English proficiency than those of the 1st grade cohort, or that LEP students in the 3rd grade cohort may have come to the U.S. more recently than LEP students in the 1st grade cohort. Further supporting for a composition effect is the fact that English proficiency for the 3rd grade cohort grows considerably from 3rd to 4th grade, from 51 percent judged good or excellent to 61 percent (not shown in the exhibit).

Unlike for native language proficiency, there are clear differences in teachers' assessments of the *English* proficiency of Hispanic and Asian students. As Exhibit 2.10 shows, in both cohorts about two-thirds of Asian students are judged to have good or excellent English proficiency, compared to well under half of Hispanic students.

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[10] See, for example, U.S. Department of Education 1997b, and U.S. Department of Education 1992.

Exhibit 2.10

Teacher Assessments of English Language Proficiency of LEP Students, By Race/Ethnicity

	Percent Whose Overall English Language Proficiency is Judged to Be:				
Cohort and Race/Ethnicity	Excellent	Good	Fair	Poor	No Proficiency
1st Grade Cohort (N=1,642)					
Hispanic	18.6%	22.1%	30.6%	22.4%	6.3%
Asian	22.4	46.3	24.9	5.4	1.1
Other	62.3	19.8	13.0	4.8	0.1
3rd Grade Cohort (N=1,739)					
Hispanic	17.1%	23.8%	32.4%	18.6%	8.2%
Asian	36.5	30.3	31.4	1.6	0.2
Other	72.4	13.6	10.3	2.6	1.0

Notes: (1) Overall language proficiency is an average of teacher assessments of proficiency in understanding, speaking, reading, and writing. (2) Data are for 1st grade (1992) for the 1st grade cohort and 3rd grade (1991) for the 3rd grade cohort.

Exhibit 2.11 shows the relationship between students' native language and English proficiency. There is a weak negative correlation between native and English proficiency for both cohorts, but it exists because of the sizeable fraction of students who are judged to have no proficiency in their native language and excellent proficiency in English. It may be that some of these students should not be classified as LEP.[11] When this subgroup is eliminated, there is essentially no correlation between native language and English proficiency.

Students without a firm knowledge of either their native language or English may face particularly serious educational challenges. Fortunately, the fraction of LEP students who have poor or no proficiency in both languages is small: 3 percent in the 1st grade cohort and 5 percent in the 3rd grade cohort (not shown in exhibit). Because native language proficiency may aid in the acquisition of English proficiency, this small group of LEP students may be expected to take longer on average to become English proficient (Thomas and Collier 1997, Ramirez 1991, De Avila 1997, and Cummins 1981).

Parents' English Language Proficiency and Use of English at Home. Slightly more than half of the parents of LEP students report that they have some command of English. However, Exhibit 2.12 shows that a large fraction of LEP students' parents—more than one-third in the 1st grade cohort and close to one-half in the 3rd grade cohort—consider their English language skills to be weak.[12] Students from these households are likely to rely heavily on schools for improving their English proficiency, although parental support is doubtless important to students' acquisition of English. The exhibit also shows that parents in the 3rd grade cohort report a slightly weaker command of English. This could be due to a possible compositional difference between LEP students in the two cohorts, as noted earlier.

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[11] It is possible that some fraction of these students are native English speakers in programs such as two-way bilingual programs. As explained in Appendix A, we used a two-step process to try to exclude these students from our LEP definition. But, generally speaking, some small degree of measurement error can be expected with survey data.

[12] The percentage of LEP students' parents with weak English skills may be underestimated here for two reasons. First, other research on adults has found a tendency to overstate English proficiency as judged by performance on standardized tests (U.S. Department of Education 1993). Second, in sample members' households where two parents had different levels of English proficiency, the survey respondent may have more likely been the parent with better English proficiency.

Exhibit 2.11

Teacher Assessments of LEP Students' English Language Proficiency, by Native Language Proficiency

Cohort and Overall Native Language Proficiency	Percent Whose Overall English Language Proficiency is Judged to Be:				
	Excellent	Good	Fair	Poor	No Proficiency
1st Grade Cohort (N=1,642)					
Excellent	16.3%	22.3%	23.5%	32.2%	5.7%
Good	2.2	29.1	34.7	26.6	7.5
Fair	4.7	36.2	33.1	21.0	5.0
Poor	7.8	26.0	44.7	15.4	6.1
No Proficiency	96.4	0.8	1.7	0.6	0.5
3rd Grade Cohort (N=1,739)					
Excellent	21.1%	35.5%	21.4%	16.9%	5.1%
Good	9.7	30.5	36.9	17.2	5.7
Fair	19.4	24.0	37.9	14.2	4.5
Poor	35.4	16.8	19.4	16.5	12.0
No Proficiency	88.3	2.8	0.3	2.4	6.3

Notes: (1) Overall language proficiency is an average of teacher assessments of proficiency in understanding, speaking, reading, and writing. (2) Data are for 1st grade (1992) for the 1st grade cohort and 3rd grade (1991) for the 3rd grade cohort.

Exhibit 2.12

Self-Reported English Language Proficiency for Parents of LEP Students

	Percent of Parents Who Say They Understand, Speak, Read and Write English:			
Cohort	Very Well	Pretty Well	Not Very Well	Not at All Well
1st Grade Cohort (N=1,642)	35.3%	26.3%	24.6%	13.8%
3rd Grade Cohort (N=1,739)	28.8%	23.4%	35.6%	12.2%

Notes: (1) Data are for 1st grade (1992) for the 1st grade cohort and 3rd grade (1991) for the 3rd grade cohort.

(2) Reported percentages were derived by averaging parents' responses to questions about understanding, speaking, reading, and writing English.

Another measure of parents' English proficiency is the frequency with which English is spoken at home. Exhibit 2.13 shows that a sizeable minority of LEP students—about 25 percent in each cohort—live in homes where English is spoken "hardly ever" or "never," according to their parents. This reinforces the conclusion above that a significant proportion of LEP students are likely to rely heavily on schools for developing English proficiency.

Perhaps not surprisingly, there is a clear positive relationship between the English proficiency of parents and their children. For example, as shown in Exhibit 2.14, among parents in the 1st grade cohort who say they speak English "not at all well," 43 percent have children whose English proficiency is judged as poor or none, while only 11 percent of these same parents have children whose English proficiency is judged as good or excellent. The same pattern holds for the 3rd grade cohort, although it is not as pronounced. Overall, the strong association between parents' self-assessments and teachers' judgements of students suggests that, despite their potential limitations, teacher assessments of language proficiency have some validity.

There is a similarly strong relationship between parents' English language proficiency and students' native language proficiency. The more proficient parents are in English, the less proficient are their children in their native language, as shown in Exhibit 2.15. For example, among parents in the 1st grade cohort who say they speak English "not at all well," 53 percent have children whose native language proficiency is judged as good or excellent, while only 16 percent of these same parents have children whose native language proficiency is judged as poor or none. This pattern is even stronger for the 3rd grade cohort. Both the student and parent data are consistent with trends of growing proficiency in English and loss of native language skills. As with English proficiency, the validity of teacher assessments of native language proficiency is buttressed by their association with parents' self-assessments.

HOW DO THE RESOURCES OF LOW-INCOME LEP STUDENTS COMPARE TO THOSE OF LOW-INCOME EP STUDENTS?

This section examines the extent to which the resources of low-income LEP students differ from low-income EP students, where resources are broadly defined to include economic resources, home supports, parent involvement and expectations, student attitudes and self-

Exhibit 2.13

Frequency With Which English is Spoken At Home

	Percent of Parents Who Say English Is Spoken In Their Home:				
Cohort	Always	Most of the Time	Some of the Time	Hardly Ever	Never
1st Grade Cohort (N=1,642)	19.0%	19.0%	35.2%	19.2%	7.6%
3rd Grade Cohort (N=1,739)	18.4%	16.5%	36.9%	19.7%	8.5%

Exhibit 2.14

Teacher Assessments of Students' English Proficiency, by Parents' Assessments Of Their Own English Proficiency

Parents' Assessment of Own Ability to Understand, Speak, Read, and Write English:	Percent of Students Whose Overall English Proficiency Is Judged to Be:				
	Excellent	Good	Fair	Poor	No Proficiency
1st Grade Cohort (N=1,642)					
Very Well	52.8%	25.7%	17.8%	3.6%	0.2%
Pretty Well	19.5	42.5	23.8	12.6	1.7
Not Very Well	7.3	12.5	34.1	35.5	10.7
Not At All Well	2.4	8.7	45.7	31.9	11.3
3rd Grade Cohort (N=1,739)					
Very Well	61.2%	22.5%	11.5%	2.4%	2.4%
Pretty Well	20.5	32.5	35.8	7.9	3.3
Not Very Well	11.8	20.3	36.6	23.2	8.2
Not At All Well	12.4	13.6	33.3	26.5	14.3

Note: Both measures of language proficiency are averages of proficiency in understanding, speaking, reading, and writing.

Exhibit 2.15

Teacher Assessments of Students' Native Language Proficiency, by Parents' Assessments of Their Own English Proficiency

Parents' Assessment of Own Ability to Understand, Speak, Read, and Write English:	Percent of Students Whose Overall Native Language Proficiency Is Judged to Be:				
	Excellent	Good	Fair	Poor	No Proficiency
1st Grade Cohort (N=1,642)					
Very Well	3.3%	6.5%	26.6%	16.4%	47.2%
Pretty Well	6.6	18.5	47.1	11.9	15.9
Not Very Well	13.4	29.8	42.9	9.5	4.4
Not At All Well	8.2	44.5	31.8	12.9	2.6
3rd Grade Cohort (N=1,739)					
Very Well	1.2%	13.4%	24.0%	23.8%	37.6%
Pretty Well	9.1	25.5	50.4	9.5	5.5
Not Very Well	11.1	37.7	38.5	11.0	1.7
Not At All Well	12.4	45.9	32.3	3.4	6.0

perceptions, and continuity of school and residence. Together these factors provide a picture of the home resources that may support students' educational achievement. Conceptually, student achievement may be thought of as a function of both school and home inputs. This section examines the home inputs, and Chapter 3 examines the school inputs provided to LEP students.

Unlike the previous section, where we presented results for all LEP students, in this section we focus on the low-income population, comparing disadvantaged LEP students to their economic peers, in an attempt to disentangle LEP status from economic status.[13] In other words, because LEP students are more likely to come from low-income households than are EP public school students, any differences we find between all LEP students and all EP students may be due primarily to their differing economic circumstances. By attempting to control for economic circumstances, we can get a clearer understanding of the extent to which LEP students differ from EP students for non-economic reasons. Further, low-income LEP students on average are likely to be in greater need of compensatory education than are non-low-income students.

For the purposes of this chapter, "low-income" families are defined as those with an average annual family income less than 185 percent of the poverty level, adjusted for family size.[14] As noted at the beginning of this chapter, about 85 percent of LEP students in both cohorts fall within this definition of low-income, compared to only about 50 percent of EP students, illustrating the importance of controlling for differences in income.

Economic Resources

This subsection compares the family income, education, and employment status of low-income LEP families to those of low-income EP families, to see whether LEP students are economically disadvantaged even relative to other low-income students.

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[13] The exhibits in this section include all other public school students as an additional comparison group, to show how low-income students—both LEP and EP—differ from all non-low-income students. These three groups together include all students in the study sample.

[14] This is similar to the eligibility standard for reduced-price school lunch.

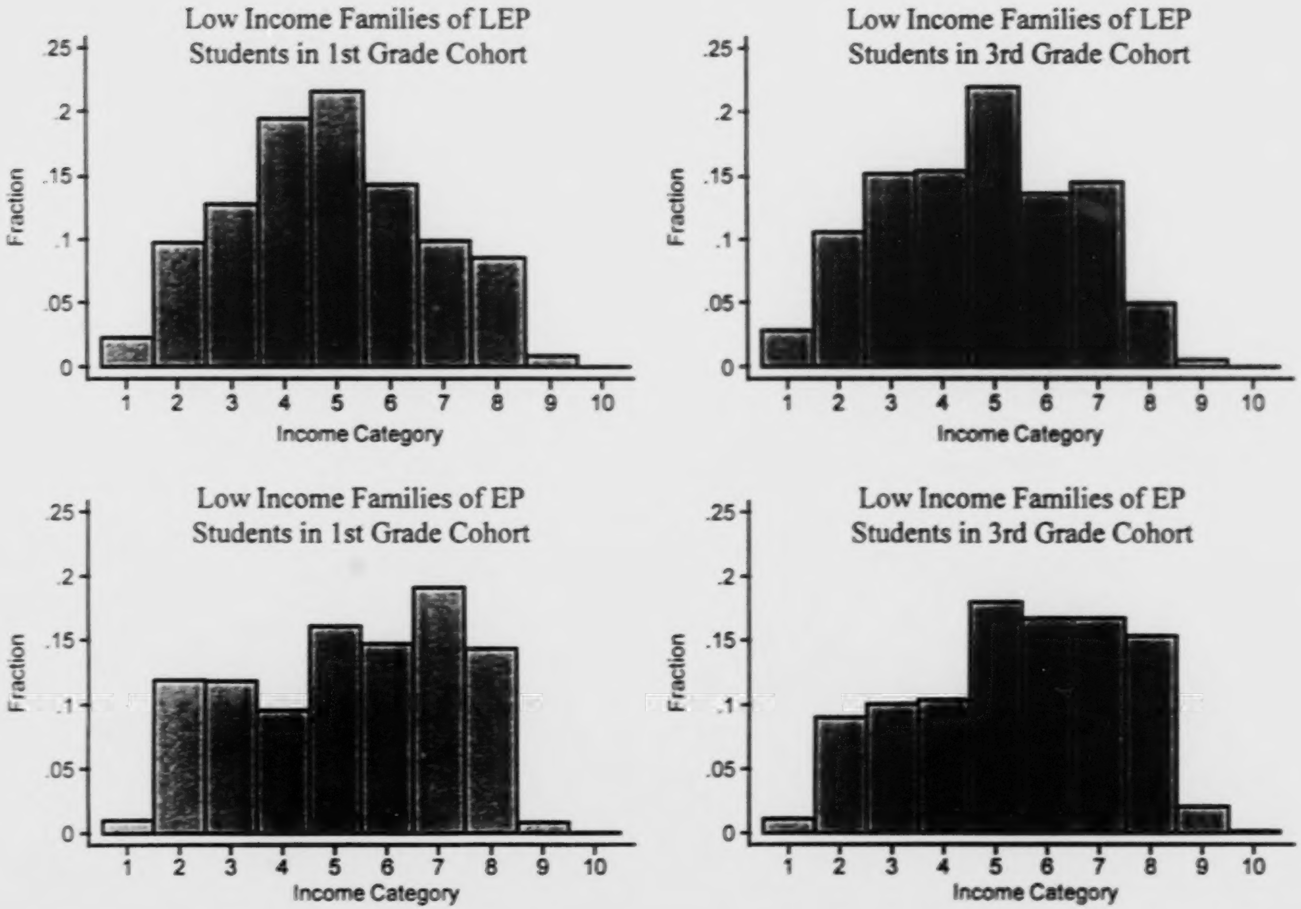
Family Income. Although we use the same income ceiling to define low-income families in both the LEP and EP groups (i.e., 185 percent of the poverty line for the relevant family size), the distribution of income within the ceiling is different for the two groups. Exhibit 2.16 shows that the distribution of income is more skewed to the right for families of low-income EP students compared to families of low-income LEP students. This means that, although focusing on low-income students goes a long way toward controlling for economic differences between LEP and EP students, it is not a perfect control. The comparison group, although low-income, is somewhat better off economically than low-income LEP students. This fact should be kept in mind when examining the results in the remainder of this chapter.

Some immigrants enter the U.S. with relatively high levels of education and career experience. While their family incomes might be quite low immediately after coming to the U.S., they may grow rapidly as they settle into careers or as their businesses develop. In some cases, a family's income may grow rapidly as more family members work full time. For such families, an income estimate during an early year of the study may not provide accurate information regarding their family income over a longer period.

Is there evidence of faster income growth for low-income LEP families than for low-income EP families? This might occur if some recent immigrants take a step down economically when they first arrive in the U.S., but move up more quickly than low-income EP families. Comparing the average growth of family income for low-income LEP and EP families, we find no evidence of different income growth rates during the duration of this study. Specifically, we calculate the average ratios of 1993 to 1992 income for the 1st grade cohort, and 1993 to 1991 income for the 3rd grade cohort. Within cohorts, the ratios of LEP and EP families are very similar (1.09 versus 1.08 in the 1st grade cohort, and 1.11 versus 1.11 in the 3rd grade cohort, not shown), so there is no evidence that LEP families have faster income growth. This is a short time span, however; to more adequately address this issue, a longer time series would be needed.

Parent Education and Employment. Parent education and employment can be viewed as economic resources, in that these factors tend to be strongly correlated with family income. In addition, parent education is likely to influence parents' expectations of their children's educational achievement, and children's own expectations, as well as parents' ability to help their children in school. Compared to parents of low-income EP students, parents of low-income LEP

Exhibit 2.16
Income Distribution for Low-Income LEP and Low-Income EP Families



Note: The income categories are: 1) No income; 2) Less than $5,000; 3) $5,000 - $7,499; 4) $7,500 - $9,999; 5) $10,000 - $14,999; 6) $15,000 - $19,999; 7) $20,000 - $24,999; 8) $25,000 - $34,999; 9) $35,000 - $49,999; and 10) $50,000 or more.

students on average have *much* lower levels of education.[15] Exhibit 2.17 shows that, for example, only about one-third of the fathers of low-income LEP students across cohorts graduated from high school, compared to three-fourths of the fathers of low-income EP students.[16] The same exhibit shows that the difference is just as large for mothers. These very large differences confer a clear disadvantage on LEP students.

Are there differences in education levels between mothers and fathers, particularly for LEP families? This might occur, for example, if other cultures place more value on fathers' than mothers' education. Comparing the education levels of mothers and fathers, there is surprisingly little evidence that mothers have less education than fathers for any of the groups (low-income LEP, low-income EP, non-low-income).[17]

In terms of employment status, there are some differences for the mothers—but not the fathers—of low-income LEP and EP students. Exhibit 2.18 shows that, for both cohorts, mothers of low-income LEP students may be somewhat less likely than mothers of low-income EP students to work outside the home. Combining both cohorts, about 44 percent of low-income LEP mothers are homemakers, compared with about 33 percent of low-income EP mothers. This difference is due to LEP mothers being less likely than EP mothers to work full- or part-time, rather than to differences in unemployment or other status (e.g., students). This may be the result of immigrant families maintaining cultural differences with regard to women working outside the home, or may be involuntary (possibly due to language barriers).

In contrast, there are no sizeable differences in the employment status of low-income LEP and EP fathers. The same exhibit shows that 82 to 86 percent of fathers in the two low-income groups work full-time. There are, however, differences in employment status between low-income and non-low-income fathers: about 97 percent of non-low-income fathers report full-time

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[15] We use the terms parent, mother, and father as shorthand for male and female parent or guardian. A small fraction of the respondents to the parent questionnaire may have been adults other than parents or guardians.

[16] The parent question that was the source of these data made no distinction between U.S. schools and non-U.S. schools, so we presume that LEP parents reported their educational attainment regardless of whether the schools were in the U.S.

[17] This result is not affected by imputation of missing data; i.e., the pre-imputed data also show little evidence of a difference in education levels between mothers and fathers.

Exhibit 2.17

Educational Attainment of Parents of Low-Income LEP and EP Students

	Percent of Parents Who Have:			
Cohort, Parent, and Sample	Less than High School Education	Graduated from High School	Some College	Graduated from College
1st Grade Cohort				
Fathers of Low-Income LEP Students (N=1,460)	64.2%	19.0%	11.8%	5.1%
Fathers of Low-Income EP Students (N=4,508)	25.6	33.1	37.2	4.2
Fathers of Non-Low-Income Students (N=3,272)	3.5	19.5	48.5	28.5
Mothers of Low-Income LEP Students (N=1,460)	65.0	18.2	11.8	4.9
Mothers of Low-Income EP Students (N=4,507)	22.4	34.3	39.7	3.6
Mothers of Non-Low-Income Students (N=3,273)	3.9	21.1	49.4	25.7
3rd Grade Cohort				
Fathers of Low-Income LEP Students (N=1,560)	71.3%	14.9%	11.1%	2.7%
Fathers of Low-Income EP Students (N=4,148)	28.4	32.2	35.6	3.9
Fathers of Non-Low-Income Students (N=3,802)	4.8	19.6	43.6	32.0
Mothers of Low-Income LEP Students (N=1,560)	76.7	10.6	12.1	0.6
Mothers of Low-Income EP Students (N=4,148)	24.5	36.4	35.4	3.8
Mothers of Non-Low-Income Students (N=3,802)	3.1	21.8	47.7	27.4

Exhibit 2.18

Employment Status of Parents of Low-Income LEP, Low-Income EP, and Non-Low-Income Students

	Percent of Parents Who:				
Cohort, Parent, and Sample	Work Full-Time	Work Part-Time	Are Homemakers	Are Unemployed	Are Retired, Disabled, or a Student
1st Grade Cohort					
Fathers of Low-Income LEP Students (N=1,460)	85.9%	4.2%	3.4%	2.8%	3.7%
Fathers of Low-Income EP Students (N=4,508)	83.5	3.0	1.5	6.2	5.8
Fathers of Non-Low-Income Students (N=3,272)	96.7	0.7	0.4	1.1	1.1
Mothers of Low-Income LEP Students (N=1,460)	35.5	10.9	46.0	3.7	3.9
Mothers of Low-Income EP Students (N=4,507)	40.7	13.1	35.4	4.8	6.1
Mothers of Non-Low-Income Students (N=3,273)	50.5	19.9	25.6	1.5	2.6
3rd Grade Cohort					
Fathers of Low-Income LEP Students (N-1,560)	82.0%	3.9%	3.1%	7.2%	3.8%
Fathers of Low-Income EP Students (N=4,148)	82.1	2.1	0.9	6.9	8.0
Fathers of Non-Low-Income Students (N=3,802)	96.9	0.6	0.2	1.5	0.9
Mothers of Low-Income LEP Students (N=1,560)	40.9	10.2	41.1	3.7	4.2
Mothers of Low-Income EP Students (N=4,148)	43.9	13.6	31.0	4.7	6.9
Mothers of Non-Low-Income Students (N=3,802)	53.1	21.7	22.1	1.3	1.8

employment. Further, less than 2 percent of non-low-income fathers report being unemployed, compared with 6 to 7 percent of low-income fathers. Higher unemployment rates for low-income fathers is consistent with these groups occupying a relatively disadvantaged position in the labor market. The employment and unemployment rates do not vary much across the years of the study (not shown).

Much education research has found that parent occupation is often a relatively strong predictor of a child's performance in school. We translated the occupations reported by parents into a commonly used occupational status scale.[18] We created a composite measure of the occupational status of mothers and fathers by averaging across both parents. Parents of low-income LEP students on average hold jobs with lower occupational prestige than parents of low-income EP students. Exhibit 2.19 shows a difference of about 8 points between the two groups in each cohort, out of a total range on this scale of 63 points (and a standard deviation of about 15 points). Both of these groups have jobs that on average are much lower on the occupational status scale than jobs held by non-low-income parents. Other research with the *Prospects* database has found parents' occupational status to be correlated with students' educational achievement, independent of students' English language skills.

Taken together, the education and employment levels of LEP students' parents show that these families are at a clear economic disadvantage, even compared to other low-income families, because of their much lower educational attainment, lower average incomes, and lower occupational status. In terms of economic resources, LEP students do not operate on a level playing field compared to other students, even other low-income students.

Family Structure

This section compares low-income LEP and EP students on the extent to which they are in two-parent households, and average family size. In general, we expect that greater parental resources are available in two-parent households, so that children in these households may be

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[18] The Duncan scale, which varies from 0 to 100, is defined for 503 detailed occupational categories in the 1980 Census, and is based on the educational attainments and income for workers in those occupations. Therefore it serves as a crude measure of socioeconomic status based on occupation. For details on the scale, see Nakao and Treas (1990). We converted the occupations in the *Prospects* parent survey to the scale score for similar occupations.

Exhibit 2.19

Occupational Status of Parents of Low-Income LEP, Low-Income EP, and Non-Low-Income Students

Cohort and Sample	Average Occupational Status
1st Grade Cohort	
Parents of Low-Income LEP Students (N=1,460)	26.6
Parents of Low-Income EP Students (N=4,507)	34.8
Parents of Non-Low-Income Students (N=3,272)	50.0
3rd Grade Cohort	
Parents of Low-Income LEP Students (N=1,560)	26.9
Parents of Low-Income EP Students (N=4,148)	35.1
Parents of Non-Low-Income Students (N=3,802)	51.1

Notes: (1) Occupational status was created by recoding occupation information from parent questionnaire to occupational status codes using the Duncan SEI. (2) Occupational status is averaged across parents.

advantaged relative to children in single-parent households.[19] Exhibit 2.20 shows that low-income LEP students are more likely than low-income EP students to come from two-parent households. For example, in the first grade cohort, 88 percent of low-income LEP students are in two-parent households, compared with 77 percent of low-income EP students. On this dimension, LEP students appear to be relatively advantaged.

The role of family size in children's well-being is less clear. Children in smaller families may benefit from more concentrated parental support (ignoring differences in whether there are one or two parents), although children can also benefit from the presence of—and interaction with—siblings.[20] Exhibit 2.21 shows that low-income LEP students have larger families than low-income EP students; the average difference is about three-fourths of a person. LEP students are much more likely than low-income EP students to be in large families (6 or more individuals). Across cohorts, more than 50 percent of low-income LEP students are in families with six or more individuals, compared to 25 to 30 percent of low-income EP students and only about 12 percent of non-low income students. LEP students in large families are likely to be more disadvantaged economically, because per capita income falls on average as family size increases.

Parent Involvement and Expectations

Beyond the more tangible factors of income, parent employment and education, and family structure, parental behaviors and attitudes can play vital roles in a student's success in school. We look at parent involvement in their child's education from three perspectives: participation in academic activities outside of school; participation in school activities; and expectations about academic outcomes. The fact that these behaviors are more difficult to measure than more material resources does not imply that they are less important. We expect each of these factors may be positively related to successful educational outcomes.

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[19] A single-parent household is defined as one in which the parent or guardian is the only adult in the home. The analysis variable was averaged across the years of the study.

[20] This assumes that, on average, larger families have a lower parent:children ratio. The parent questionnaire asks about total household members, and does not ask separately about children and adults.

Exhibit 2.20

Percent of Low-Income LEP, Low-Income EP, and Non-Low-Income Students in Two-Parent Households

Cohort and Sample	Percent in Two-Parent Households
1st Grade Cohort	
Low-Income LEP Students (N=1,460)	87.9%
Low-Income EP Students (N=4,507)	76.9
Non-Low-Income Students (N=3,272)	92.6
3rd Grade Cohort	
Low-Income LEP Students (N=1,560)	90.7%
Low-Income EP Students (N=4,148)	81.8
Non-Low-Income Students (N=3,802)	92.3

Exhibit 2.21

Family Size of Low-Income LEP, Low-Income EP, and Non-Low-Income Students

	Percent of Students in Families With:					
Cohort and Sample	1-3 Persons	4-5 Persons	6-7 Persons	8-9 Persons	10-16 Persons	Average Family Size
1st Grade Cohort						
Low-Income LEP Students (N=1,460)	7.8%	37.0%	46.0%	6.7%	2.5%	5.5
Low-Income EP Students (N=4,507)	12.7	61.5	21.4	3.5	0.9	4.8
Non-Low-Income Students (N=3,272)	14.6	73.9	11.2	0.3	0.1	4.3
3rd Grade Cohort						
Low-Income LEP Students (N=1,560)	5.0%	37.8%	42.9%	9.7%	4.7%	5.7
Low-Income EP Students (N=4,148)	11.1	58.8	24.3	4.5	1.2	4.9
Non-Low-Income Students (N=3,802)	16.1	72.0	10.9	0.7	0.2	4.3

Parent Involvement. We examine parent involvement outside school in children's academic activities by looking at the frequency with which parents engage in such activities as: helping with homework or checking that it is done; reading with their children; talking about school events and subject matter; and talking about expectations and goals. More specifically, we constructed an average of parent responses on the frequency of these activities. Exhibit 2.22 shows that parents of low-income LEP students are no less likely to participate in the academic activities of their children outside school than are parents of low-income EP students. Across both cohorts and all three groups there is no apparent difference in parent involvement.

The results for parent participation in *school activities* are somewhat different. The measure used is an average of the frequency with which parents have visited their children's school to do any of the following: have a formal conference or informal talk with teacher or principal; observe a play, sporting event or concert; volunteer for a school project or trip; observe or volunteer in the classroom; or participate in a parent-teacher organization or advisory committee. Most of these activities require some parent initiative (as opposed to the school contacting parents), and all could be beneficial to the child. Exhibit 2.23 shows that parents of low-income LEP students are more likely than parents of low-income EP children—and much more likely than parents of non-low-income children—*never* to participate in activities at their children's school. Language barriers or cultural differences are possible reasons for the apparent lesser involvement of LEP parents.[21]

Another measure of parental support is the amount of time alone children spend after school with no adult present. Less time alone indicates, on average, greater interaction between the child and other adults, and more opportunity to foster educational (or language) development. This measure was taken from student responses. Exhibit 2.24 shows that, relative to low-income EP students, low-income LEP students in both cohorts spend a greater amount of time alone per day at home. Forty-four percent of the low-income LEP students in the 1st grade cohort spend at least some time home after school with no adult, compared with 38 percent of low-income EP

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[21] Exhibit 2.23 also shows that, for low-income LEP and EP students, parent participation declines across cohorts: parents in the 3rd grade cohort are more likely than parents in the 1st grade cohort never to participate in activities at their children's school. Within each cohort, however, there is no evidence of a decline in parent participation over time (results not shown).

Exhibit 2.22

Average Frequency of Parents' Participation in Academic Activities with Their Children, for Parents of Low-Income LEP, Low-Income EP, and Non-Low-Income Students

	Percent of Parents Who Participate in Academic Activities with Their Children:			
Cohort and Sample	Daily	Once or Twice per Week	Less than Twice per Month	Rarely If Ever
1st Grade Cohort				
Low-Income LEP Students (N=1,460)	38.2%	57.7%	4.0%	0.1%
Low-Income EP Students (N=4,507)	36.6	58.9	4.3	0.2
Non-Low-Income Students (N=3,272)	34.4	62.5	2.9	0.1
3rd Grade Cohort				
Low-Income LEP Students (N=1,560)	23.5%	66.8%	8.7%	1.0%
Low-Income EP Students (N=4,148)	21.4	70.8	7.3	0.4
Non-Low-Income Students (N=3,802)	18.9	74.3	6.5	0.2

Exhibit 2.23

Average Frequency of Parents' Participation in Activities at Their Children's School, for Parents of Low-Income LEP, Low-Income EP, and Non-Low-Income Students

	Percent of Parents Who Participate in Activities at Their Children's School:		
Cohort and Sample	Never	Once or Twice this School Year	Three or More Times this School Year
1st Grade Cohort			
Low-Income LEP Students (N=1,460)	48.7%	50.0%	1.2%
Low-Income EP Students (N=4,507)	40.4	57.1	2.4
Non-Low-Income Students (N=3,272)	23.0	69.4	7.6
3rd Grade Cohort			
Low-Income LEP Students (N=1,560)	58.6%	40.5%	0.9%
Low-Income EP Students (N=4,148)	47.8	50.7	1.5
Non-Low-Income Students (N=3,802)	25.9	69.4	4.7

Exhibit 2.24

Time Spent At Home After School With No Adult Present: Low-Income LEP, Low-Income EP, and Non-Low-Income Students

	Percent of Students Who Say They Are At Home After School With No Adult:				
Cohort and Sample	Never Or Hardly Ever	Less than One Hour	1 to 2 Hours	2 to 3 Hours	More than 3 hours
1st Grade Cohort					
Low-Income LEP Students (N=1,460)	55.8%	16.5%	7.8%	9.0%	10.8%
Low-Income EP Students (N=4,507)	62.0	16.3	7.8	4.2	9.7
Non-Low-Income Students (N=3,272)	64.3	16.1	8.5	3.8	7.3
3rd Grade Cohort					
Low-Income LEP Students (N=1,560)	47.7%	19.7%	9.8%	5.2%	17.5%
Low-Income EP Students (N=4,148)	58.0	17.8	10.7	4.9	8.7
Non-Low-Income Students (N=3,802)	55.9	18.9	12.4	6.4	6.4

students.[22] The difference is similar in the 3rd grade cohort: 53 percent of low-income LEP students compared to 42 percent of low-income EP students. Greater time alone for low-income LEP students may be a result of the poorer economic situation (and presumably lower wages) for families with LEP children, which requires spending more time working outside the home. This result is probably not due to differences in family structure across these groups, because LEP students are more likely to be in larger, two-parent households than are low-income EP students, and more likely to have a mother who does not work outside the home.

Parent Expectations. As measures of parents' expectations for—and attitudes toward—their children, we examine parent-reported measures of: how often parents and child disagree about rules; how often parents talk to their child about academic expectations; how often parents talk to their child about future plans and goals; parents' expectations about whether their child will graduate from college; parents' expectations about their child's future grades in school; and whether parents are saving money for child's college education.

Exhibit 2.25 shows that low-income LEP families may be less likely to disagree about rules than low-income EP families. In the 1st grade cohort, 43 percent of low-income LEP families disagree about rules at least once or twice per week, compared to 56 percent of low-income EP families. The differences are just as large for the 3rd grade cohort. This may be a reflection of cultural differences. There are no clear differences in this measure between Hispanic and Asian students (not shown).

Parents of low-income LEP and EP students do not differ much in how often they speak with their child about school expectations. Exhibit 2.26 shows that LEP parents are no less likely than low-income EP parents to speak daily with their child about school expectations. Further, both groups of parents of low-income students speak more frequently with their children about school expectations than do parents of non-low-income students. It may be that low-income parents see education as a vehicle for their children to escape their disadvantaged status.

On a closely related measure, parents of low-income LEP students are more likely to talk to their child at least once a week about future plans and goals. Exhibit 2.27 shows that this

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[22] For the 1st grade cohort, this information is available only for 1994, when most of these students were in 3rd grade. For the 3rd grade cohort, information on time alone is available for three years, corresponding to 3rd, 4th, and 5th grades.

Exhibit 2.25

Average Frequency With Which Parents Say They Disagree With Their Children About Discipline or Family Rules, for Parents of Low-Income LEP, Low-Income EP, and Non-Low-Income Students

	Percent of Parents Who Say They Disagree With Their Children About Discipline or Family Rules:			
Cohort and Sample	Daily	Once or Twice per Week	Less than Twice per Month	Rarely If Ever
1st Grade Cohort				
Low-Income LEP Students (N=1,460)	11.6%	31.2%	36.9%	20.3%
Low-Income EP Students (N=4,507)	10.5	45.6	30.8	13.1
Non-Low-Income Students (N=3,272)	6.8	42.0	36.5	14.7
3rd Grade Cohort				
Low-Income LEP Students (N=1,560)	10.5%	24.3%	43.2%	21.9%
Low-Income EP Students (N=4,148)	8.4	42.8	37.3	11.5
Non-Low-Income Students (N=3,802)	5.2	40.8	40.8	13.1

Exhibit 2.26

Average Frequency With Which Parents Say They Talk With Their Child About Expectations for School Performance, for Parents of Low-Income LEP, Low-Income EP, and Non-Low-Income Students

	Percent of Parents Who Say They Talk With Their Children About Expectations for School Performance:			
Cohort and Sample	Daily	Once or Twice per Week	Less than Twice per Month	Rarely If Ever
1st Grade Cohort				
Low-Income LEP Students (N=1,460)	28.7%	55.2%	13.1%	3.0%
Low-Income EP Students (N=4,507)	21.7	54.0	19.4	4.9
Non-Low-Income Students (N=3,272)	13.0	51.9	29.5	5.6
3rd Grade Cohort				
Low-Income LEP Students (N=1,560)	23.7%	57.8%	15.6%	3.0%
Low-Income EP Students (N=4,148)	20.5	57.3	18.5	3.7
Non-Low-Income Students (N=3,802)	14.3	55.2	27.1	3.4

Exhibit 2.27

Average Frequency With Which Parents Say They Talk With Their Child About Future Plans and Goals, for Parents of Low-Income LEP, Low-Income EP, and Non-Low-Income Students

	Percent of Parents Who Say They Talk With Their Children About Future Plans and Goals:			
Cohort and Sample	Daily	Once or Twice per Week	Less than Twice per Month	Rarely If Ever
1st Grade Cohort				
Low-Income LEP Students (N=1,460)	19.6%	56.9%	18.2%	5.4%
Low-Income EP Students (N=4,507)	10.0	40.4	38.0	11.6
Non-Low-Income Students (N=3,272)	4.9	28.9	53.5	12.7
3rd Grade Cohort				
Low-Income LEP Students (N=1,560)	20.2%	47.8%	26.7%	5.3%
Low-Income EP Students (N=4,148)	10.0	38.5	44.5	7.0
Non-Low-Income Students (N=3,802)	4.3	33.4	54.0	8.3

pattern holds across both grade cohorts. Two-thirds to three-fourths of parents of low-income LEP students talk to their children about future plans and goals at least once a week, compared to one-half of parents of low-income EP students (and only 35 percent of non-low-income parents). The frequency is higher for parents of the 1st grade cohort LEP students than for parents of the 3rd grade cohort LEP students, but there is no difference across cohorts for low-income EP families. Parents of LEP students may provide somewhat more attitudinal support in response to the special challenges faced by their children as a result of being taught in a language different from their native language, or because of cultural differences, or due to their lower average family income.

To gauge parents' expectations about their children's educational attainment, we examine parent responses regarding: their children's performance in future grades, whether their children will earn a college degree, and whether they are saving money for their children's education. We constructed composite measures of these variables by averaging across years. Results on these measures provide little evidence that parents of low-income LEP students have lower expectations than parents of low-income EP students about their children's educational attainment. Exhibit 2.28 shows that about the same share of parents in the two groups expect their child to do above average in future grades. There is likewise no clear difference between the two groups of parents in their beliefs that their children will graduate from college. On both these measures, however, parents of non-low-income students have strikingly higher expectations. There is no evidence of a difference in expectations between cohorts.

The share of parents who save money for their children to attend college is a little more difficult to interpret as a reflection of parents academic expectations for their children, because it is also likely to be a reflection of disposable income. Given the differences in income among low-income LEP, low-income EP, and non-low-income families, it is not surprising that parents of low-income LEP students are less likely to be saving money for college than are parents of low-income EP students, and both these groups are much less likely to be saving money than are non-low-income parents.

Exhibit 2.28

Parents' Expectations of Their Children's Educational Attainment, for Parents of Low-Income LEP, Low-Income EP, and Non-Low-Income Students

Cohort and Sample	Percent of Parents Who Say They Think Their Child Will Do Above Average in Future Grades	Percent of Parents Who Say They Think Their Child Will Graduate From College	Percent of Parents Who Say They Have Done Something Specific to Have Some Money For Their Child's Education After High School
1st Grade Cohort			
Low-Income LEP Students (N=1,460)	33.4%	55.0%	29.4%
Low-Income EP Students (N=4,507)	35.9	54.2	39.7
Non-Low-Income Students (N=3,272)	58.8	85.5	70.8
3rd Grade Cohort			
Low-Income LEP Students (N=1,560)	30.9%	47.0%	28.6%
Low-Income EP Students (N=4,148)	34.5	52.9	37.8
Non-Low-Income Students (N=3,802)	59.7	84.6	71.5

Student Attitudes and Self-Perceptions

Do low-income LEP students have different attitudes about their teachers and themselves than do low-income EP students? Positive attitudes and self-esteem are likely to influence success in school. To better understand these psychological effects, this study looks at three measures of student attitudes about school and three measures of student self-perceptions.

Student Attitudes about School. The three measures used for student attitudes about school are whether students: (1) perceive teachers as being fair; (2) believe that teachers listen to them; and (3) say that students get along well with their teachers. In addition to providing information about student attitudes, responses to these questions may be a function of teacher's actions and interpersonal skills.

Exhibit 2.29 shows that all three groups of students believe their teachers are fair and listen to them. Three-fourths or more of the students in each group and cohort believe their teachers are fair and listen, and differences across groups are small. The decline in these measures from the 1st grade cohort to the 3rd grade cohort may reflect growing independence on the part of older students. These results suggest that LEP students have positive views of their teachers, and think as well of their teachers as do other students.

There is a difference in the third measure: low-income LEP students in the 3rd grade cohort are more likely than low-income EP students to say that they get along well with their teachers. Exhibit 2.29 shows little difference among the 1st grade cohort students, but a difference of 17 percentage points for the 3rd grade cohort students. The difference for LEP students may be a reflection of cultural differences, such as greater respect for teachers, which may become more important as students age. Whatever the reason, greater ability to get along with teachers may be functional to better achievement.

Student Self-Perceptions. The three measures used for student self-perceptions are whether a student: (1) believes that he or she can do as well as most people; (2) is mostly satisfied with himself or herself; and (3) sometimes thinks that he or she is no good at all. These measures provide an indication of LEP students' self-esteem, and how it compares to that of other students. As with the other psychological measures discussed above, high levels of self-esteem may be functional to better academic achievement.

Exhibit 2.29

Student Attitudes About School, for Low-Income LEP, Low-Income EP, and Non-Low-Income Students

	Percent of Students Who Say:		
Cohort and Sample	Their Teachers Are Fair	Their Teachers Listen to Them	Students Get Along Well With Teachers
1st Grade Cohort			
Low-Income LEP Students (N=1,460)	87.4%	85.4%	77.3%
Low-Income EP Students (N=4,507)	84.1	86.3	74.6
Non-Low-Income Students (N=3,272)	86.1	86.8	74.5
3rd Grade Cohort			
Low-Income LEP Students (N=1,560)	76.1%	77.6%	72.1%
Low-Income EP Students (N=4,148)	75.7	73.7	55.1
Non-Low-Income Students (N=3,802)	80.2	79.0	64.9

On all of these measures and for both cohorts, low-income LEP students show lower levels of self-esteem than other low-income students, although in most cases the difference is small. Further, both these groups score below the non-low-income group. Exhibit 2.30 shows that, although at least three-fourths of the low-income LEP students in both cohorts believe that they can do as well as most people and are satisfied with themselves, the share of low-income LEP students who believe this is smaller than the share of low-income EP and non-low-income students. Similarly, a larger percentage of LEP students think sometimes that they are no good at all, compared to the other two groups. For example, 44 percent of low-income LEP students in the 1st grade cohort agree with this statement, compared to 35 percent of low-income EP students. The lower scores for LEP students may reflect the greater challenges they face. Not only do they tend to be disproportionately in high-poverty schools, but they face the additional challenges of learning in a language that is not their primary language and, for some LEP students, adapting to a culture that is not their native culture. Whatever the cause, lower self-esteem may impede LEP students' educational progress.

Changing Schools

On balance, students who change schools more frequently may be at a disadvantage compared to non-movers, because they are less likely to get a continuous and consistent stream of educational services, and have to adjust more often to new learning and social environments. This may be even more of a problem for LEP than for EP students because the former need all the same services as the latter, plus special English language services. We examine school mobility by counting the number of times students change schools over the study period. Because we have three years of data for the 1st grade cohort and four years of data for the 3rd grade cohort, we can observe students changing schools no more than twice in the 1st grade cohort and three times in the 3rd grade cohort.

Exhibit 2.31 shows that low-income LEP students may change schools more often than low-income EP students and non-low-income students. Forty-three percent of low-income LEP students in the first grade cohort change schools during the observation period, compared to 34 and 18 percent of low-income EP and all other students, respectively. If 40 percent of LEP students change schools between first and third grade, it seems likely that, over the course of the

Exhibit 2.30

Students' Self-Perceptions, for Low-Income LEP, Low-Income EP, and Non-Low-Income Students

	Percent of Students Who Say:		
Cohort and Sample	They Are Able To Do Things As Well As Most People	They Are Satisfied With Themselves	At Times They Think They Are No Good At All
1st Grade Cohort			
Low-Income LEP Students (N=1,460)	80.0%	76.7%	44.0%
Low-Income EP Students (N=4,507)	83.4	88.8	35.1
Non-Low-Income Students (N=3,272)	87.2	91.5	34.6
3rd Grade Cohort			
Low-Income LEP Students (N=1,560)	77.1%	76.6%	38.0%
Low-Income EP Students (N=4,148)	83.4	84.6	35.5
Non-Low-Income Students (N=3,802)	89.0	91.5	27.5

Exhibit 2.31

Number of Times Students Changed Schools Within The Study Period, for Low-Income LEP, Low-Income EP, and Non-Low-Income Students

	Percent of Students Who Changed Schools:			
Cohort and Sample	Did Not Change	Once	Twice	Three Times
1st Grade Cohort				
Low-Income LEP Students (N=1,460)	57.5%	16.2%	26.4%	--
Low-Income EP Students (N=4,507)	66.2	15.3	18.6	--
Non-Low-Income Students (N=3,272)	82.5	7.1	10.5	--
3rd Grade Cohort				
Low-Income LEP Students (N=1,560)	56.4%	16.4%	12.8%	14.4%
Low-Income EP Students (N=4,148)	62.2	10.3	10.6	16.9
Non-Low-Income Students (N=3,802)	75.5	6.5	8.4	9.6

Note: Students in the first grade cohort were observed for three years, so the maximum possible number of years with a school change is two.

entire five or six elementary years, half or more of low-income LEP students will change schools. LEP students may change schools more than other students because of their parents' relatively tenuous position in the labor market, which may lead to more frequent job turnover. Whatever the explanation, the high mobility rates of LEP students may slow down their acquisition of English language and cognitive skills, other things equal, and therefore is another potential disadvantage faced by LEP students.

SCHOOL POVERTY AND LEP CONCENTRATION

In this section we describe the schools that LEP students attend in terms of two characteristics: concentration of school poverty and school LEP concentration. The results in this section will show the extent to which LEP students are disadvantaged by being in high-poverty schools, and will show the difficulty of disentangling family poverty, school poverty, and school LEP concentration. This school-level perspective complements the individual-level characteristics discussed in the previous sections of this chapter; both perspectives are useful in understanding LEP students' backgrounds.

To what extent do LEP students attend high-poverty schools? To answer this question, we classify a school as "high poverty" if at least one-half of the students are eligible for free or reduced-price meals.[23] Exhibit 2.32 shows that *about three-fourths of all LEP students in both cohorts attend high-poverty schools*. In contrast, only about one-third of all EP students attend high-poverty schools. LEP students are clearly attending schools with high concentrations of poor students.

To what extent do LEP students attend schools with high concentrations of LEP students? The last column of Exhibit 2.32 shows that the LEP students in our sample attend schools where the average LEP concentration is about 25 percent. In contrast, the EP students in our sample attend schools where the average LEP concentration is under 5 percent. The average school LEP

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[23] The National School Lunch Program and the National School Breakfast Program subsidize meals served by public and private schools to eligible low-income children. Generally, children are eligible for free meals if their family income is below 130 percent of the Federal poverty line, and are eligible for reduced price meals if their family income is between 130 and 185 percent of the poverty line. This measure of school poverty is used relatively often in educational research.

Exhibit 2.32

Attendance of High Poverty Schools and School LEP Concentration, for LEP and All Other Students

Cohort and Sample	Weighted Sample Size	Percent of Students in Schools With at Least a 50% Poverty Rate	Average School LEP Concentration
1st Grade Cohort			
All LEP Students (N= 1,642)	333,961	73.8%	25.1%
All Other Students (N=7,598)	3,252,460	37.2	4.5
3rd Grade Cohort			
All LEP Students (N=1,739)	265,689	76.9%	28.3%
All Other Students (N=7,771)	2,816,501	26.9	3.4

concentration for all students in the sample is about 6 percent (not shown). It is clear that there is a certain amount of segregation of LEP students, i.e., they tend to be concentrated in particular schools. An advantage of this is that LEP students may be more likely to receive appropriate language services where there are a sufficient number of LEP students, because of economies of scale. The problem, however, as shown above, is that LEP students are concentrated in high-poverty schools.

How strong is the relationship between school LEP concentration and school poverty? Exhibit 2.33 shows a very strong association between these two; schools with high LEP concentrations are almost invariably high-poverty schools. Across both cohorts, *more than 90 percent* of *all* students in schools with high (greater than 25 percent) LEP concentrations are also in high-poverty schools. This relationship is mirrored at the other end of the scale, where roughly three-fourths of *all* students in schools with low LEP concentrations (less than or equal to 5 percent) are *not* in high-poverty schools. In sum, the greater the concentration of LEP students, the greater the likelihood that a school contains a high concentration of poor students.

To a large extent, this association reflects the fact that the overwhelming majority of LEP students are in low-income families, and children in low-income families tend to go to high-poverty schools. Exhibit 2.34 shows the strong relationship between school poverty and family poverty. Over 80 percent of LEP students from low-income families attend high-poverty schools. However, the corresponding number for EP students is much lower: combining both cohorts, less than 50 percent of EP students from low-income families attend high-poverty schools. This means that low-income LEP students are much more likely to go to high-poverty schools than are low-income EP students. LEP students are disadvantaged by the schools that they attend, even compared to their EP economic peers.

Subdividing the sample of LEP students by race or ethnicity shows that Hispanic LEP students are much more likely than Asian LEP students to attend high-poverty schools. Exhibit 2.35 shows that, across both cohorts, about 85 percent of Hispanic LEP students are in high-poverty schools, compared to about 45 percent of Asian LEP students.

Exhibit 2.33

The Relationship Between School Poverty and School LEP Concentration

Cohort and School LEP Concentration	Weighted Sample Size	Percent of Students in Schools With at Least a 50% Poverty Rate
1st Grade Cohort (N=9,240)		
0 - 5%	2,596,631	28.3%
6 - 15%	451,740	52.4
16 - 25%	199,869	85.4
26 - 100%	338,181	93.5
Total	3,586,421	
3rd Grade Cohort (N=9,510)		
0 - 5%	2,408,508	21.2%
6 - 15%	262,033	35.6
16 - 25%	174,291	82.4
26 - 100%	237,358	90.8
Total	3,082,190	

Exhibit 2.34

Percentage of Low-Income LEP and EP Students Attending High-Poverty Schools

Cohort, Sample, and Family Income	Weighted Sample Size	Percent of Students in Schools With at Least a 50% Poverty Rate
1st Grade Cohort		
Low-Income LEP Students (N=1,460)	277,265	82.1%
Low-Income EP Students (N=4,507)	1,749,459	52.8
3rd Grade Cohort		
Low-Income LEP Students (N=1,425)	236,013	80.4%
Low-Income EP Students (N=4,148)	1,274,527	42.7

Note: "Low-income" is defined as family income less than or equal to 185 percent of the Federal poverty line, adjusted for family size.

Exhibit 2.35

Percentage of LEP Students Attending High Poverty Schools, by Race/Ethnicity

Cohort and Race/Ethnicity	Weighted Sample Size	Percent of Students in Schools With at Least a 50% Poverty Rate
1st Grade Cohort (N=1,465)		
Hispanic	243,625	86.9%
Asian	38,403	39.7
Other LEP	51,933	37.3
Total	333,961	
3rd Grade Cohort (N=1,546)		
Hispanic	191,841	83.3%
Asian	31,923	48.6
Other LEP	41,925	69.1
Total	265,689	

SUMMARY

The central result of this chapter is that, on many measures of family resources and characteristics, LEP students are clearly disadvantaged *even compared to other low-income students*. This in turn suggests that, to the extent that the goal of federal educational policy and resources is to help "level the playing field" for all groups of students, an argument could be made to focus special services on LEP students.

The key findings of this chapter regarding the disadvantages faced by LEP students are:

- About three-fourths of all LEP students attend high-poverty schools. In contrast, only about one-third of English proficient (EP) students attend high-poverty schools.
- LEP students tend to be concentrated rather than dispersed across schools; and schools with the highest LEP concentrations are almost invariably high-poverty schools. LEP students attend schools where the average LEP concentration is about 25 percent; in contrast, EP students attend schools where the average LEP concentration is less than 5 percent. Of schools with LEP concentrations above 25 percent, almost all are high-poverty schools. Thus, LEP students are clearly disadvantaged by the schools they attend.
- Compared to parents of low-income EP students, parents of low-income LEP students on average have *much* lower levels of education.
- Parents of low-income LEP students are less likely than parents of low-income EP students to participate in activities at their children's school, perhaps because of language barriers or cultural differences.
- Relative to low-income EP students, low-income LEP students spend a greater amount of time per day alone at home.
- Low-income LEP students change schools more often than low-income EP students and non-low-income students.

At the same time, the analyses in this chapter found several positive background indicators for LEP students compared to other low-income students. Among these are:

- Low-income LEP students are more likely than low-income EP students to come from two-parent households.

- Parents of low-income LEP students are more likely than parents of other low-income students to talk to their child at least once a week about future plans and goals.

- At least 70 percent of LEP students are judged by their teachers to have good or excellent proficiency in at least one language.

CHAPTER 3

EDUCATIONAL SERVICES FOR LEP STUDENTS

This chapter focuses on the educational services provided to limited English proficient (LEP) students in elementary school. We address several important research questions on the school and classroom setting in which educational services are provided, the quality of the instructional staff, and the instructional content of classes attended by LEP students. Where appropriate, we compare the educational services received by LEP students to those received by English proficient (EP) students. These educational services, along with the characteristics of LEP students that were covered in the prior chapter, have a major influence on the educational outcomes of LEP students. But unlike students' characteristics, which are generally beyond the influence of education policy makers, the services covered in this chapter are affected by local, state, and federal education policies. The net result of these two factors—student outcomes—is examined in the next chapter.

This chapter examines survey reports of teacher credentials, access to instructional materials and computers, and other factors. While this provides useful measures, it does not include direct measures of instructional quality, such as how English language (or native language) instructional materials are actually used in instruction. As various studies of instructional reform have documented, there is sometimes a nontrivial difference between teacher survey data and the data from teacher logs, classroom observations or other direct measures. Nevertheless, as work by Porter et al. (1993) and others has found, teacher survey results provide useful information for assessing learning opportunity.

As in the rest of the report, the *Prospects* data that we use in this chapter are, when appropriately weighted, nationally representative, longitudinal samples of U.S. public school students in the 1st grade in the fall of the 1991-92 academic year and in 3rd grade in the spring of the 1990-91 academic year. Data were collected for each cohort through the spring of 1994, providing three years of data for the 1st grade cohort and four years of data for 3rd grade cohort. Thus, we have data on the 1st grade cohort as students progress from 1st to 3rd grade, and similarly for the 3rd grade cohort as students progress from 3rd to 6th grade. In looking at patterns over time, we adopt the convention in this report of labeling each year's results as though all students remained on grade level throughout the follow-up period. For example, we call the second year (1993) of data collection for the 1st grade cohort "2nd grade," even though a small fraction of the students in that cohort were retained in 1st grade that year and other students skipped a grade and were in 3rd grade that year. As discussed in Chapter 1, in longitudinal samples of this sort, later years of data are not fully representative of the grade level to which they pertain. For example, 1993 data for the 1st grade cohort do not represent *all* 2nd graders in the nation even with universal advancement on grade level, since some number of students *enter* U.S. public schools between 1st and 2nd grades but are not included in the sample.

It should also be emphasized that the educational services for LEP students in this chapter pertain only to students who are in elementary school (1st through 6th grade) and may not generalize to LEP students in higher grades. For information on educational services provided to middle school and high school students, see Fleischman and Hopstock (1993).

Overview of This Chapter

This chapter consists of three parts, each focusing on a different aspect of LEP students' elementary school experience. First, we address the question: *Are educational services responsive to the special needs of LEP students?* In this section, we examine school-level characteristics, teachers' qualifications, and instructional services that are appropriate for the special needs of students with limited English proficiency. The analysis in this section is therefore restricted to students identified as limited English proficient during the *Prospects* study period.

Next, we address the question: *Do limited English proficient students receive the same quality of educational inputs as English proficient students?* Here we examine general educational services that are important measures of the quality of education received by LEP and EP students alike. These include measures of the regular classroom teachers' qualifications, the classroom instructional setting, and material resources.

Because LEP students on average attend schools with higher rates of family poverty than do EP students, we restrict our comparison of LEP and EP students to high-poverty schools, in order to partially disentangle educational differences due to local economic conditions from remaining differences associated with limited English language proficiency per se.[1] We define a high-poverty school as a school where over half of the enrolled students are eligible for free or reduced-price school lunches.[2] In Chapter 2, we found that about three-fourths of LEP students were in high-poverty schools, whereas about one-third of EP students were in high-poverty schools. If we compared the educational services provided to LEP and EP students at all schools, we would—in large part—be comparing the services provided at high-poverty schools (LEP students) to the services provided at lower-poverty schools (EP students), which is not the focus of this study. For completeness, information on all students—LEP plus EP—in lower-poverty schools is also presented, but generally not discussed in the text.

Finally, we address the question: *Do LEP students receive the same level of instructional content as EP students?* In this section, we examine the skills emphasized by students' regular math and reading/English/language arts teachers, the types of instructional materials used, and the use of computers in instruction. As in the prior section, this analysis uses data on the 1993-94 academic year and compares LEP and EP students in high-poverty schools.

Interpretation of Weighted Results

All results reported in this chapter are based on analysis using the *Prospects* student-level weights. The weights are designed so that the results for the 1st grade cohort reflect the national population of public school students in the 1st grade in the Spring of 1992. Similarly, the results for the 3rd grade cohort reflect the population of public school students in 3rd grade in the Spring of 1991.[3]

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[1] We chose to compare the educational experience of EP and LEP students based upon comparable levels of school-level poverty rather than family poverty because schools are the fundamental structure through which the educational inputs we analyze in this chapter are delivered.

[2] The family-level poverty measure used in Chapter 2 and the school-level poverty measure in this chapter are closely related. The family-level poverty measure defines a poor family as a family with income below 185 percent of the poverty line, while the school-level poverty measure used here is based upon the percent of students eligible for free or reduced-price lunches. The standard eligibility rules for receiving free or reduced-price lunches requires the student be from a family with income below 185 percent of the poverty line. A little over 80 percent of LEP students from low-income families attend high-poverty schools (see Exhibit 2.34 in Chapter 2).

[3] For information about the sample design and weighting procedures, see Bryant (1993).

The *Prospects* study follows students over time, rather than teachers or schools. Hence, our analyses of school-, classroom-, or teacher-level characteristics should be interpreted as reflecting the population of public school students in the nation (as of 1991 or 1992) rather than the population of schools, classrooms, or teachers. For example, if we examine the proportion of schools with after-school clubs, the correct interpretation would be that X percent of students attend schools with after-school clubs, rather than X percent of schools have after-school clubs.

A Brief Comment on Imputation Procedures

As is the case with all longitudinal surveys, especially surveys that attempt to collect a comprehensive set of variables from many different sources, procedures for dealing with missing data are of critical importance to the *Prospects* study. Our procedures for imputing missing data are described in detail in Appendix D. We performed separate imputations for school characteristics, classroom- and teacher-level characteristics for each subject and cohort, and student-level characteristics for each cohort. In each case, we inferred a plausible value for the missing variable based on values of related variables for the same student (or teacher or classroom or school) and values of the same variable for other similar observations (other years, students, teachers, classrooms, or schools). For each set of imputations, two criteria had to be met before undertaking imputation: there had to be a sufficient number of related variables with non-missing data for that observation; and there had to be enough observations in the sample as a whole with non-missing data for the variable being imputed. This means that we still have small amounts of missing data for which we did not impute. A little over one percent of students are missing data on school-level characteristics and between three and four percent of students are missing data on classroom- and teacher-level characteristics. Only a handful of students are missing data on student-level characteristics. Although it is unlikely that the remaining missing data are missing at random, they affect only a very small proportion of the overall sample, and thus are unlikely to substantially affect our results.

ARE EDUCATIONAL SERVICES RESPONSIVE TO THE SPECIAL NEEDS OF LEP STUDENTS?

In this section, we examine educational inputs that are pertinent to the needs of students with limited English proficiency to ascertain whether the appropriate services are available and provided to LEP students, and whether the qualifications of school staff are consistent with providing for the special needs of LEP students. Because the educational inputs examined in this section are not relevant to English proficient students, we limit the analysis to students identified as LEP at any time during the survey period.[4]

The first subsection examines school-level services and the language background of the principal leading the school. The second subsection examines the qualifications of the regular classroom teachers in the classes attended by LEP students. The third subsection examines the responsiveness of instructional content received by LEP students at various reading and writing proficiency levels.

Do the schools attended by LEP students have integrated, focused LEP programs well-supported by and coordinated within the school structure as a whole?

School characteristics define the broad environment in which LEP students receive their education, and therefore are potentially important influences on student outcomes. We examine the extent to which schools address the special needs of LEP students by looking at the following measures:

- The availability of English-as-a-second language (ESL) and bilingual education (BE) classes;[5]
- The principal's language background and training;
- The degree of coordination between regular classroom teachers and special ESL/BE instructors;

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[4] See Chapter 1 for a description of our procedures for coding students as LEP at any time using *Prospects* data.

[5] ESL classes are designed to teach listening, speaking, reading and writing English language skills to limited-English-proficient students. Bilingual education generally means English language instruction supplemented by non-English instruction. Both ESL and bilingual education are used to teach content, not only English language skills.

- The extent of integration of LEP and English proficient students during the course of the school day;
- The availability of services for the families of LEP and other language minority students; and
- The degree of respect parents of LEP students feel they and their children receive from school staff.

The goal here is to measure the characteristics of the typical school attended by LEP students. To do this, we first associate each LEP student with the characteristics of his or her school during each year of the observation period (because students can be in different schools in different years). Each student's school environment is then averaged across years[6] and weighted according to the share of the population the student represents. We then use these student-level weighted observations to characterize the environment faced by the typical LEP student during the study period.

Do LEP students' schools offer classes to meet the specific needs of LEP students? To address this question, we first examine the availability of ESL/BE instructional services, funded by Chapter 1 or other sources, in the school and at the grade in which LEP students are enrolled.[7] We also look at whether the school offers a program of instruction in the history or culture associated with the backgrounds of its language minority (LM) and limited English proficient students.[8] The quality of services is likely to have important impacts on student learning. While this study includes information on access to service and other factors, it does not include direct measures of service and instructional quality.

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[6] If a student attends more than one school during the observation period, we average the characteristics of the different schools. Based on measures of school-level poverty and the percent of students at the school who are LEP, most LEP students who changed schools moved to a similar school. Two-thirds of LEP students leaving a high-poverty school (a school where more than 50 percent of the students are eligible for a free or reduced-price lunch) moved to a high-poverty school and three-fourths of LEP students leaving a lower-poverty school moved to a lower-poverty school. About half the students moving from a school where more than 15 percent of the students were LEP moved to a similar school and almost all students moving from a school where less than 15 percent of the students were LEP moved to a similar school.

[7] For students who do not stay on grade level in later years of the study, we do not use actual grade level but the grade they would have attended had they remained on grade level. Some school-level *Prospects* questions were asked only for those grades in which students on grade level were enrolled.

[8] An LM student is a student in whose home a non-English language is typically spoken. Such students may include those proficient in English and able to benefit from instruction in academic subjects offered in English as well as students whose English proficiency is limited. LEP students are a subgroup of LM students and consist of

As the first row of Exhibit 3.1 indicates, LEP students in 1st through 3rd grade between 1992 and 1994 (in the 1st grade cohort) attended schools that offered ESL/BE instructional services at their grade level about 91 percent of the time. LEP students in the 3rd grade cohort—who attended 3rd through 6th grade between 1991 and 1994—had a little less access to ESL/BE services, attending schools that offered those services to their grade level about 83 percent of the time. These numbers show that the great majority of students categorized as LEP at some point during the observation period attend schools with ESL/BE services available at their grade level in any given year.[9]

Our estimates of the availability of ESL/bilingual programs at a school are lower than those reported in Han *et al's* (1997) study using Schools and Staffing Survey (SASS) data, but there is a substantial difference in the calculations that is consistent with the difference in estimates. The SASS report estimates that 97 percent of LEP students attended schools that offered an ESL or bilingual instructional program in the 1993/94 academic year (p.12). Our estimates (91 percent for the 1st grade cohort and 83 percent for the 3rd grade cohort) are based on whether an ESL/bilingual instructional program is offered at the student's grade level. Thus, if the school offers an ESL/bilingual program, but not at the student's grade level, the Han *et al.* estimate counts the student as attending a school where an ESL or bilingual program is available, whereas our estimate *does not* count the student as attending a school where an ESL or bilingual program is available unless it is available *in their grade level*. Essentially, we have different indicators of the availability of ESL/BE programs at schools attended by LEP students. This difference in what each indicator is measuring is consistent with our lower estimate of the availability of ESL/BE programs at schools attended by LEP students.

The lower half of Exhibit 3.1 shows that LEP students' schools are somewhat less likely to offer programs of instruction in the history, culture, or ethnic studies associated with the

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students whose native language is not English and whose skills in listening to, speaking, reading, or writing English are such that he/she derives little benefit from school instruction in English.

[9] School districts are required by law to provide language-related services to LEP students who need them, and the numbers presented in Exhibit 3.1 suggest a high, but not complete, level of compliance with this requirement.

Exhibit 3.1

Percent of LEP Students Attending Schools that Offer Specific Instructional Services to Meet the Needs of LEP Students, by Cohort

1st Grade Cohort	
ESL/BE Instructional Services Offered in Student's Grade	90.8%
Program in Background of LM-LEP Students	69.8
3rd Grade Cohort	
ESL/BE Instructional Services Offered in Student's Grade	82.5%
Program in Background of LM-LEP Students	70.0

Notes: In this exhibit, LEP students include all students identified as limited English proficient at any time during the survey period.

background of their LM-LEP students. LEP students attend schools that offer this type of program 70 percent of the time for both cohorts (i.e., while in the 1st through 5th grades[10]). Even when offered in a school, however, these programs may not have been provided to the particular student of interest or cover his or her specific cultural background.

Do LEP students' principals have the appropriate training to be cognizant of the special needs of students with limited English proficiency? Two measures of the background and training of principals at schools attended by LEP students that may indicate how well the principal can provide leadership for a school's LEP-related programs are: whether the principal has received recent training in ESL/BE education, and whether the principal is proficient in the predominant non-English language of LM-LEP students at the school. We examine both these measures below.

As can be seen in Exhibit 3.2, approximately 60 percent of the time between 1991 to 1994 LEP students were in schools with principals who had received training in ESL/BE education during the past three years. While this indicates that a substantial percentage of LEP students' principals had received recent training in language-appropriate teaching methods, the principals were not asked to report the type or extent of this training. Hence, it could be as little as part of an in-service day, or as much as an advanced degree in bilingual education.

Nearly 30 percent of LEP students' principals report being proficient in the predominant non-English language of LM-LEP students at their school.[11] Other research has found some reason to question the accuracy of self-reports of language proficiency (see, e.g., Kirsch et al.

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[10] This question was not asked in the 1994 questionnaire and so is not available for the 6th grade.

[11] Principals are only asked about their proficiency in the predominant non-English language of LM-LEP students, hence we do not know if the principal is proficient in other non-English languages spoken by LEP students at the school. For example, a Korean-speaking student at a school with mostly Spanish-speaking LM-LEP students is counted as attending a school where the principal is proficient in the predominant non-English language of LM-LEP students if the principal is proficient in Spanish, even if the principal is not proficient in Korean. Conversely, if the principal is not proficient in Spanish, the student is counted as attending a school where the principal does not speak the predominant non-English language of LM-LEP students, even if the principal is proficient in Korean. We cannot tell from our data whether or not these two effects cancel each other out, or whether the estimated percent of LEP students with principals who are proficient in the predominant non-English language of LM-LEP students is an over- or under-estimate of the percent of LEP students with principals who are proficient in the students' first language.

Exhibit 3.2

Percent of LEP Students Attending Schools with Principals Who have Specialized Training to Meet the Needs of LEP Students, by Cohort

1st Grade Cohort	
Principal Reports . . .	
Receiving ESL/BE Training in Past 3 Years	59.2%
Proficiency in Predominant LM-LEP Language	29.7
3rd Grade Cohort	
Principal Reports . . .	
Receiving ESL/BE Training in Past 3 Years	62.5%
Proficiency in Predominant LM-LEP Language	30.3

Note: In this exhibit, LEP students include all students identified as limited English proficient at any time during the survey period.

1993, and Anderson 1982). Still, it is likely that a non-trivial share of LEP students attend schools where the principal is proficient in the student's native language.

Do ESL/bilingual education and regular classroom staff coordinate their instruction to LEP students? This question is addressed by looking at school staff responses to a series of questions asking about the frequency with which specific procedures are used to coordinate instruction to ESL/BE participants. Frequent consultations to coordinate instruction of LEP students could substantially enhance the content and teaching effectiveness for LEP students and allow for effective integration of LEP and EP students' instruction.

As can be seen in Exhibit 3.3, the most common procedure for coordinating instruction for ESL/BE participants is informal discussions between ESL/BE and regular instructional staff. In 1st and 2nd grade (1st grade cohort), the *Prospects* data show that 44 percent of LEP students are in schools where informal discussions occur between regular and ESL/BE teachers on a daily basis. LEP students in 3rd through 5th grades (3rd grade cohort) are in such schools 39 percent of the time.[12] The table also shows that where daily discussions do not occur, weekly or monthly discussions usually do. Even so, it is unclear whether *all* ESL/BE instruction in a given student's school is coordinated in this fashion, or just *some* of it. Thus, it is likely that the figures in the table overstate the extent to which individual students benefit from this type of coordination, since some may be in schools that provide this coordination daily but in specific ESL/BE classes that do not.

The more formal and concrete coordination procedures shown in the table—joint development of written lesson plans, formal meetings, sharing of written records, and a common planning period—are far less common. As can be seen in the first column of the exhibit, LEP students in both cohorts were in schools that utilized these procedures on a daily basis only two to 18 percent of the time during the 1991 to 1993 period. A substantial share of LEP students attended schools where these coordination procedures are used at most annually, if at all. For

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[12] Though they are derived from the same universe of public elementary schools, the results in the tables can differ between cohorts for several reasons. Likely the most important reason is that 1st grade cohort LEP students attend a somewhat different mix of schools than 3rd grade cohort LEP students. This would occur, for example, if some schools move students out of the LEP classifications used in this report at an early grade level than other schools, causing the "LEP rapid exit" schools to be more heavily represented in the 1st grade cohort figures (which pertain to students classified as LEP in the 1st through 3rd grades) than in the 3rd grade cohort figures (which pertain to students classified as LEP in the 3rd through 6th grades).

Exhibit 3.3

Frequency that LEP Students Attend Schools that Rely on Specific Procedures to Coordinate Instruction Between ESL/BE and Regular Instructional Staff, by Cohort

	Frequency of Coordination				
Procedure	**Daily**	**Weekly**	**Monthly**	**Annually**	**Never**
1st Grade Cohort					
Informal discussions	44.4%	31.4%	15.1%	2.3%	6.8%
Common planning period	18.2	14.5	17.2	10.9	39.2
Share written records	7.0	15.8	46.4	15.4	15.4
Consult in development of written lesson plans	5.7	27.0	28.0	16.1	23.2
Formal meetings	2.0	33.6	30.8	9.0	24.7
3rd Grade Cohort					
Informal discussions	39.4%	31.4%	15.0%	5.2%	9.0%
Common planning period	12.3	19.9	28.9	14.8	24.0
Share written records	12.3	18.7	47.0	15.5	6.4
Consult in development of written lesson plans	6.5	30.6	23.2	23.1	16.6
Formal meetings	4.3	32.2	35.5	11.5	16.4

Note: In this exhibit, LEP students include all students identified as limited English proficient at any time during the survey period.

example, nearly two out of five LEP students are in schools where ESL/BE and regular classroom teachers do not consult with each other in developing a written plan more than once a year and nearly one-third are in schools where there is at most one formal meeting a year to coordinate their instruction.

Do LEP students' schools have a policy of integrating LEP students with EP students through the course of the school day? It may also be important whether students with limited English proficiency are integrated with their English proficient peers throughout the school day. It is important for LEP students to receive the same content EP students do, and LEP students should not be segregated unduly. However, being in the same classroom with English proficient students poses problems if, due to language, the child is not able to understand what is being taught. The study did not collect specific data on how and for what reasons students were integrated. All other things equal—including access to special ESL/BE services—we would expect LEP students to benefit from greater integration with their EP peers. This benefit could arise in one of two ways. Integrating LEP students and EP students throughout the day may benefit LEP students' development of English language and social interaction skills through interaction with native speakers of English. LEP students who take academic courses with EP students may also be more likely to be held to the same academic standards as their EP peers. On the other hand, separating LEP students for academic courses may allow more effective access to course content if the separation is supported through the use of LEP students' native languages. If LEP and EP students are separated for academic courses, putting LEP and EP students together in non-academic classes is a way to avoid segregation. This also provides opportunities for LEP students to practice understanding and speaking skills in English through interaction with other students who are proficient in English.

As Exhibit 3.4 shows, LEP students were in schools with a policy of integrating EP and LEP students for non-academic subjects (art, music) or non-instructional times (lunch, homeroom) between 95 and 97 percent of the time during the survey period. School policies to integrate LEP and EP students for academic subjects were less common, however. Excluding language instruction, about 77 percent of LEP students were in schools that integrated LEP and EP students for academic subjects. This measure, however, does not reveal the *degree* of integration (e.g.,

Exhibit 3.4

Percent of LEP Students Attending Schools that Integrate LEP and EP Students for Academic or Non-Academic Instruction, by Cohort

1st Grade Cohort	
Integrate for Non-Academic Subjects or Non-Instructional Time	97.0%
Integrate for Academic Subjects	77.7
3rd Grade Cohort	
Integrate for Non-Academic Subjects or Non-Instructional Time	95.5%
Integrate for Academic Subjects	77.1

Note: In this exhibit, LEP students include all students identified as limited English proficient at any time during the survey period.

are LEP and EP students integrated for the entire instructional period for all academic subjects), nor does it reveal how LEP students are taught in schools that do not integrate instruction.

Does the school provide special services to families of LM-LEP students? The special services a school provides to aid the families of LEP students is an important indicator of a school's focus on and dedication to LEP students. These special services help LEP students' parents monitor their children's education and facilitate their involvement in the school. School staff were asked a series of questions on the availability of special services for families of LM-LEP students.

Based on these measures, Exhibit 3.5 shows that about 90 percent of LEP students in both cohorts were in schools that conducted meetings in the parents' non-English language or made translation available for parent-teacher and/or parent-school meetings. Of the special services asked about in the *Prospects* survey, this is the most common, which is not surprising because it the only one of our service indicators that is legally required in some programs for limited English proficient students. While the widespread availability of this service at schools is a very promising indicator, it does not mean that meetings or translation services were available for *every* non-English language spoken by parents of LEP students, or that those services were available at *every* meeting.

The table also shows that over half of all LEP students were in schools that made special home visits to families of LM-LEP students. We have no measure of *how many* LEP students received such visits, but the visit's existence at a student's school is a favorable signal of the school's overall support of LEP students. It is also encouraging that nearly one-quarter of LEP students attended schools that reported assigning a specific outreach worker to serve as an ombudsperson for the problems and concerns of LM-LEP families.

Do parents of LEP students believe they and their children are respected by school staff? Respect for LEP students and their parents may signify a number of things about the school environment that could have an important influence on the educational experience of LEP students. The level of respect that parents feel school staff have *for them* may indicate the extent to which parents believe their concerns and questions are taken seriously by school staff. Similarly, the level of respect parents feel the school staff has *for their children* could indicate

Exhibit 3.5

Percent of LEP Students Attending Schools that Offer Specific Services to Parents or Families of LEP Students, by Cohort

1st Grade Cohort	
Non-English translation available for parent/school meetings	91.3%
Home visits to families of LM-LEP students	52.7
Specific outreach worker assigned to families of LM-LEP students	23.5
3rd Grade Cohort	
Non-English translation available for parent/school meetings	90.4%
Home visits to families of LM-LEP students	56.5
Specific outreach worker assigned to families of LM-LEP students	24.0

Note: In this exhibit, LEP students include all students identified as limited English proficient at any time during the survey period.

whether parents think the needs of their child are being recognized and whether a sincere effort is being made to meet their child's needs.

To analyze these factors, we examined LEP parents' level of agreement to the statements: *"I am respected by the teachers and principal"* and *"My child is respected by the teachers and principal."*[13] We also examined the responses of the parents of English proficient students for comparison with the parents of LEP students.

As can be seen in Exhibit 3.6, almost all students—at least 96 percent—attended schools where parents strongly agreed or agreed that they and their children were respected by school staff. Parents of LEP students are just as likely as parents of EP students to say that school staff respect them and their children.[14] This result suggests that respect for students and their parents is not perceived by either parents of EP or LEP students as a particular problem, although the fact that virtually every response was positive suggests the possibility of some degree of positive response bias.

Summary. Do the schools that LEP students attend run integrated, focused LEP programs well supported by and coordinated within the school structure as a whole? The evidence from the *Prospects* study presented in this section generally supports this proposition, though it must be qualified in an important respect.

Several schoolwide measures of support for LEP students show initially encouraging evidence: the availability of ESL/BE instruction, principals' language background, coordination and integration of LEP and EP instruction, and support and respect for the families of LEP students. Sixty to 100 percent of LEP students attend schools with favorable indicators in each of these areas. These figures represent an important beginning for a public school system that seeks to support and nurture all students with limited English proficiency.

But these findings do not of themselves demonstrate broad support for the needs of individual LEP students, or even the average LEP student. As noted in our discussion of the

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[13] The parent responses reported here are from the Parent Questionnaire, which was not administered in the last year of the study, 1994. Unlike the data used in the rest of the analyses, missing parent responses were not imputed; hence about 13 percent of all the students' parents are not included in this particular analysis.

[14] Cultural differences between the parents of LEP students and parents of EP students may also lead to different levels of perceived respect for identical treatment by school staff. Some parents of LEP students are from cultures that may be more respectful of authority than is typical in the United States.

Exhibit 3.6

Parents' Report of Whether They and Their Children are Respected by School Staff, by Cohort and Students' English Proficiency

	LEP	EP
Are you respected by the teachers and principal?		
1st Grade Cohort		
Strongly Agree	57.7%	48.9%
Agree	41.3	49.1
Disagree	1.0	1.8
Strongly Disagree	0.1	0.1
3rd Grade Cohort		
Strongly Agree	45.6%	35.5%
Agree	53.3	62.5
Disagree	1.0	1.7
Strongly Disagree	0.3	0.1
Is your child respected by the teachers and principal?		
1st Grade Cohort		
Strongly Agree	53.8%	51.6
Agree	42.8	46.5
Disagree	3.4	1.6
Strongly Disagree	0.0	0.3
3rd Grade Cohort		
Strongly Agree	44.6%	39.4%
Agree	54.0	57.6
Disagree	1.2	2.9
Strongly Disagree	0.1	0.2

Note: In this exhibit, LEP students include all students identified as limited English proficient at any time during the survey periods.

results, we cannot tell from the *Prospects* data *how many* of the LEP students in a particular school benefit from favorable practices and policies known to exist *somewhere* in the school. Thus, our analysis of school environment paints a somewhat incomplete picture: schools are supportive to a degree—perhaps a large degree—but we do not know how many of their LEP students benefit from this support. Extension of the analysis to the in-school experience of individual LEP students in subsequent sections of the chapter will address this limitation of the generally encouraging schoolwide indicators presented here.

Do LEP students regular classroom teachers and aides have the appropriate training to meet the needs of LEP students?

In this section, we focus on two measures of teacher training that indicate preparedness to meet the needs of students with limited English proficiency: ESL/BE certifications earned, and proficiency in languages other than English spoken by students in their class.[15] The results reported in this section are for LEP students' regular classroom math and reading/English/ language arts teachers for all years covered by the *Prospects* study.

Although we only report results for LEP students' primary math and reading/English/language arts teachers (who can be funded by standard or supplementary sources), we examine the available data for additional Chapter 1-funded teachers and aides and additional ESL/BE teachers and aides funded by programs other than Chapter 1. Results for these groups are not reported here, because data for these instructors have high unusually high missing rates—between 20 and 60 percent—that make results difficult to interpret due to potential missing data bias and the inherently smaller sample sizes involved. Nevertheless, to try to paint the complete picture of LEP students' teacher qualifications, we do include qualitative reports of these results for instructors with non-missing data.

Are LEP students' regular classroom teachers certified in ESL and/or BE? A key issue is whether or not the teachers of LEP students have specialized training to provide services to students who are not fully proficient in the English language. These skills could substantially enhance educational outcomes for LEP students. As Han *et al.* (1997, p.16) note:

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[15] General qualification of instructors are covered in a later section, where we compare LEP and EP students from high-poverty schools.

> *There is almost universal agreement that teacher training and preparation in the subject area in which he or she is assigned to teach are among the most important characteristics of a qualified teacher.*

Certification in English-as-a-second language and bilingual education are two indicators of specialized training, and hence two indicators of the quality of LEP students' teachers. One limitation of these indicators is that some states do not offer certification in ESL/BE, so specialized training acquired by teachers in these states will not be measured with these indicators.[16]

Exhibit 3.7 shows that between one-third and one-half of LEP students' regular reading/English/language arts teachers in the elementary school grades are certified in ESL and/or BE. Of the teachers certified, there is roughly an even split between teachers certified in ESL and BE, ESL only, and BE only. In the later elementary school grades, teachers are more likely to be certified in ESL only. For example, in 6th grade, 27 percent of LEP students' regular reading/English/language arts teachers are certified in ESL only, while three percent are certified in ESL and BE, and another six percent are certified in BE only.[17]

Exhibit 3.8 presents ESL/BE certification information for regular math teachers. A smaller percentage of LEP students' math teachers than reading/English/language arts teachers are certified in ESL or BE: 66 percent of LEP students' 1st grade math teachers are certified in neither ESL nor BE, and by 6th grade 90 percent of the regular math classes are headed by a teacher who is certified in neither ESL nor BE. For math teachers, bilingual education is the more common area of training, with over one-fourth of students' 1st grade teachers certified in BE (including teachers certified in both ESL and BE), a rate that generally decreases as the grade level increases to a low of eight percent for teachers of 6th grade students.

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[16] Whitten *et al.* (1995, pp. 9-11) lists states by whether they offer certification in bilingual education, ESL, or related areas.

[17] The finding that teachers of LEP students in later elementary school grades are more likely to be certified in ESL only is consistent with patterns reported by Fleischman and Hopstock (1993, p.46) across elementary and middle schools.

Exhibit 3.7

Percent of LEP Students With Regular Reading/English/Language Arts Teachers Who are Certified in English-as-a-Second Language and/or Bilingual Education, by Grade and Cohort

	Certified in Both ESL and BE	Certified in ESL Only	Certified in BE Only	Certified in Neither ESL nor BE
1st Grade Cohort				
Grade 1 (1992)	13.5%	11.9%	15.3%	59.3%
Grade 2 (1993)	16.6	13.3	16.7	53.4
Grade 3 (1994)	18.9	12.5	11.2	57.5
3rd Grade Cohort				
Grade 3 (1991)	12.9%	8.3%	16.0%	62.7%
Grade 4 (1992)	7.2	16.4	10.6	65.9
Grade 5 (1993)	12.2	22.3	6.9	58.6
Grade 6 (1994)	2.8	26.9	6.5	63.8

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include only students that were identified as limited English proficient in the year specified in the row heading.

Exhibit 3.8

Percent of LEP Students With Regular Math Teachers Who are Certified in English-as-a-Second Language and/or Bilingual Education, by Grade and Cohort

	Certified in Both ESL and BE	Certified in ESL Only	Certified in BE Only	Certified in Neither ESL nor BE
1st Grade Cohort				
Grade 1 (1992)	6.0%	4.6%	23.9%	65.4%
Grade 2 (1993)	7.3	3.8	26.5	62.4
Grade 3 (1994)	7.5	7.7	22.0	62.8
3rd Grade Cohort				
Grade 3 (1991)	5.1%	1.7%	22.9%	70.4%
Grade 4 (1992)	4.8	1.9	13.2	80.0
Grade 5 (1993)	4.5	2.8	16.1	76.6
Grade 6 (1994)	2.0	2.2	5.7	90.0

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include only students identified as LEP in the year specified in the row heading.

Additional analyses of special Chapter 1 and ESL/BE instructors show similar patterns of certification to those reported here (not shown in exhibits). This suggests that the results shown here for regular classroom teachers are indicative of all LEP students' instructors for these subjects.

Fleischman and Hopstock (1993, page 46) report that 16 percent of elementary school teachers of LEP students during the 1991-92 academic year were certified in bilingual education and 10 percent were certified in ESL. These estimates are smaller than our estimates because they have the teacher as the unit of observation, whereas our estimates have the student as the unit of observation. Therefore a teacher with 20 LEP students in his or her class counts approximately 20 times as much in our estimates as a teacher with one LEP student, whereas both count the same amount in Fleischman and Hopstock's estimates. The differences between the numbers imply that LEP students' teachers are more likely to be certified in ESL or bilingual education when they have more LEP students in their class. Consistent with this implication, Han *et al.* (1997, page 18) found that 20 percent of teachers with classes composed of more than 50 percent LEP students had earned an academic degree in ESL or bilingual education (a more stringent indicator of specialized training than certification) compared to one percent of teachers with fewer than 10 percent LEP students.[18]

One reason that so many LEP students have teachers without special training is the difficulty in finding teachers that have these qualifications. Henke *et al.* (1996) found that one-fourth of public schools reported they had vacancies for an ESL or bilingual education position in 1994. Among the schools with a vacancy, 26 percent reported they would find it difficult or impossible to fill the vacancy.

Are LEP students' regular classroom teachers and aides proficient in the students' native language? Teachers' proficiency in the native language of the students in their classroom is another indicator of the qualifications and specialized training that are beneficial to students with limited English proficiency. A teacher who is proficient in the native language of a LEP student may have an easier time communicating with the student, be more aware of the linguistic differences between the student's native language and English, and be more sensitive to the student's cultural background. Furthermore, proficiency in the student's native language may also facilitate meetings with the student's parents, allowing parents to be more actively involved in their child's education.

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[18] Han *et al.* (1997) also report a broader measure of specialized training of teachers, whether teachers have received any training in teaching LEP students. They found that one-third of elementary school teachers with LEP students in their class reported they had received some specialized training and that nearly 87 percent of teachers with more than 50 percent LEP students in the class had reported receiving specialized training.

The proportion of LEP students' reading/English/language arts teachers and aides reporting proficiency in the *predominant* LM-LEP language of their class is shown in Exhibit 3.9, while math teachers' and aides' reported proficiency is show in Exhibit 3.10. Note that language proficiency is self-reported and that teachers are only asked about their proficiency in the predominant LM-LEP language of their class, so we do not know if they are proficient in the first language of LEP students who do not speak the predominant LM-LEP language.

The first columns of Exhibits 3.9 and 3.10 show that between 32 and 46 percent of the LEP students' reading/English/language arts and math teachers are proficient in the predominant LM-LEP language of the class in 1st through 5th grade. However, the proportion of LEP students' 6th grade teachers that report proficiency declines to 20 percent for reading/English/language arts classes and 16 percent for math.

As can be seen in the second column of the exhibits, classroom aides are far more likely to be proficient in the predominant LM-LEP language than teachers. Of the LEP students in classes with classroom aides, between 64 and 89 percent have math and reading/English/language arts aides who are proficient in the predominant native language of LEP students in their class. This large contrast between aides and teachers suggests that one of the roles of the aides in these classes is to facilitate communication, and hence learning, with LEP students.[19]

The proportion of special Chapter 1 and ESL/BE instructors who are proficient in the predominant non-English language of LEP students in their classes (not shown in exhibits) are more similar to the patterns of classroom aides than of teachers. This suggests that some LEP students have sources for non-English instruction beyond what can be inferred from the analysis of their regular classroom teachers and aides, and that—despite having similar certification levels

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[19] Fleischman and Hopstock (1993, p. 40) also suggest that aides in LEP students' classrooms are more likely than teachers to be proficient in students' native languages.

Exhibit 3.9

Percent of LEP Students With Regular Reading/English/Language Arts Teachers and Aides Who Report Proficiency in the Predominant LM-LEP Non-English Language of the Class, by Grade and Cohort

	Regular Reading/English/ Language Arts Teachers	Regular Reading/English/ Language Arts Classroom Aides
1st Grade Cohort		
Grade 1 (1992)	40.5%	87.8%
Grade 2 (1993)	46.4	82.9
Grade 3 (1994)	37.5	82.5
3rd Grade Cohort		
Grade 3 (1991)	37.0%	70.3%
Grade 4 (1992)	32.7	82.5
Grade 5 (1993)	32.1	73.6
Grade 6 (1994)	20.4	70.8

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include only students identified as LEP in the year specified in the row heading.

Exhibit 3.10

Percent of LEP Students With Regular Math Teachers and Aides Who Report Proficiency in the Predominant LM-LEP Non-English Language of the Class, by Grade and Cohort

	Regular Math Teachers	Regular Math Classroom Aides
1st Grade Cohort		
Grade 1 (1992)	44.8%	88.8%
Grade 2 (1993)	44.7	82.5
Grade 3 (1994)	38.2	80.2
3rd Grade Cohort		
Grade 3 (1991)	40.7%	78.3%
Grade 4 (1992)	34.7	83.7
Grade 5 (1993)	33.8	63.8
Grade 6 (1994)	15.7	69.9

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include only students identified as LEP in the year specified in the row heading.

in ESL and BE methods—additional Chapter 1 and ESL/BE teachers are more qualified in the native languages of many LEP students than are regular classroom teachers.

Are the instructional services provided in the classroom appropriate to the educational needs of LEP students?

As our most direct measure of LEP-focused instructional practice, we start this analysis with indicators of LEP student participation in ESL/bilingual instruction in each elementary school year. Wherever possible, we identify the source of funding for this instruction. The next set of analyses compare teacher ratings of LEP students' English proficiency and subsequent provision of ESL/BE services. Following up on these analyses, we examine the proportion of instruction that is provided in a non-English language as part of a bilingual educational format. Finally, we investigate LEP student receipt of supplementary instructional services in math and reading/English/language arts for all grades and years covered in the *Prospects* study. Here again, we distinguish between Chapter 1-funded instruction and other sources of funding.

In the final part of this section, we compare the specific needs of LEP students, as indicated by their primary teacher's rating of their English and native language proficiency, to teachers' reports of the skills emphasized in classroom instruction during the subsequent year, for those students moving from 3rd to 4th grade between the 1991-92 and 1992-93 school years.

Do LEP students receive ESL/bilingual instructional services? Although there is controversy in the educational literature about the right mix of English, native language, and ESL instruction to provide to students with limited English proficiency, many researchers and practitioners agree that LEP students need some ESL and/or bilingual instruction to progress in step with their native English-speaking peers.[20] Instructional models range from "immersion" programs conducted completely in English to "two-way" or "developmental" programs which seek to build full proficiency of all students in two languages (e.g., English and Chinese). Other instructional models include ESL programs that provide special instructional approaches and supports to learn English, "early exit" bilingual programs that emphasize a quick exit into classes conducted entirely in English, and "late exit" bilingual programs that provide more first language support before placing the student into classes conducted entirely in English.

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[20] See August and Hakuta (1997), Crawford (1995), Hakuta (1986, 1990), Krashen (1991), and Lam (1992) for a summary of the research findings and debate over ESL, bilingual education, and English-immersion programs.

In practice, there are few sites that implement any of these models in pure form. Courses which are formally developmental bilingual programs often include large instructional components in English. Conversely, classrooms which are formally "immersion" or ESL frequently include substantial modifications of instruction and language use to support language learning. Moreover, the research indicates that language learners typically develop understanding and speaking proficiency in a new language faster than reading and writing ability in the new language—and that development of full proficiency in all these areas takes in excess of five years.[21]

Exhibit 3.11 shows the proportion of LEP students in each year and grade that are reported to receive either ESL or bilingual instruction. These services are disaggregated by funding source, where the source of funding is identifiable in the data.[22]

As can be seen in the last column of the exhibit, all but 12 to 25 percent of the LEP students in any elementary grade level receive ESL or BE services. This is consistent with other findings in the literature. Macias (1996, p. 2) reports that 24 percent of K-12 LEP students in the 1994-95 academic year are not served by a special program designed to meet their needs. Han *et. al's* (1997, p. 15) findings indicate that 23 percent of elementary school students did not receive ESL instruction and 55 percent are not taught a subject in their native language in the 1993-94 academic year, but the data as reported by Han do not permit estimation of what percent of students receive neither of these services. Using a definition of special services for LEP students broader than just ESL or bilingual education programs (e.g., including tutoring and a

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[21] See August and Hakuta (1997) and Ramirez *et al.* (1991) for more discussion of these topics.

[22] A student is identified as a Chapter 1 participant in ESL/bilingual services if school records indicate that he or she received Chapter 1 ESL/BE instruction. A student is identified as receiving non-Chapter 1 funded ESL/bilingual instruction if the school records indicated that he or she received non-Chapter 1 funded ESL/BE instruction or had an ESL/BE teacher or aide (by definition, not funded by Chapter 1). The "unknown funding source" category includes all the students identified as receiving ESL/BE services by their primary teacher due to their limited English Proficiency, but for whom school records do not indicate the source of funding. Schoolwide Chapter 1 is indicated if the student is identified as receiving ESL/BE services from any of the above sources and the student is also in a school participating in the Chapter 1 schoolwide program.

Exhibit 3.11

Percent of LEP Students Receiving ESL/BE Instructional Services, by Source of Funding, Grade, and Cohort

	Receive ESL/BE Through:					
	Schoolwide Chapter 1 Program	Chapter 1 and Non-Chapter 1 Funding	Chapter 1 Funding Only	Non-Chapter 1 Funding Only	Unknown Funding Source	No ESL/BE Services Received
1st Grade Cohort						
Grade 1 (1992)	4.8%	12.3%	9.8%	47.2%	13.4%	12.6%
Grade 2 (1993)	8.8	16.9	6.2	45.7	8.0	14.4
Grade 3 (1994)	7.7	10.3	6.8	36.7	13.2	25.2
3rd Grade Cohort						
Grade 3 (1991)	3.4%	11.0%	3.7%	56.6%	11.3%	14.1%
Grade 4 (1992)	4.2	12.1	11.9	41.9	12.0	17.8
Grade 5 (1993)	10.6	11.0	9.1	38.6	12.8	18.0
Grade 6 (1994)	7.4	9.5	11.9	36.1	13.5	21.5

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include only students identified as LEP in the year specified in the row heading.

special aide for LEP students), Fleischman and Hopstock (1993, p. 24) found that only 3 to 12 percent of LEP students did not receive instructional services specific to LEP students.[23]

Exhibit 3.11 shows the Chapter 1 program is a substantial funding source for ESL/BE services. Depending on the year and cohort, between one-fifth and one-third of the students receive Chapter 1 funded ESL/bilingual instruction. Nevertheless, in contrast to supplemental services for math and reading/English/language arts (discussed below), the primary source of funding for ESL/bilingual instruction is from sources other than Chapter 1. On average, nearly three times as many LEP students receive ESL/BE instruction funded by non-Chapter 1 sources as receive such services funded by Chapter 1. (ESL/BE services funded by both sources are included in both counts for this calculation.) Between 47 and 68 percent of LEP students receive ESL/bilingual instruction funded by non-Chapter 1 sources, whereas between 15 and 24 percent receive these services funded by the Chapter 1 program, depending on the year and grade. An additional 3 to 11 percent of LEP students receive ESL/bilingual instruction at a school operating a Chapter 1 schoolwide program. Overall, the share of non-served students appears to be rising over the years of the study (1991 to 1994) as non-Chapter 1 funded ESL/BE services declines.[24] Although specific non-Chapter 1 funding sources cannot be identified in the *Prospects* data, Fleischman and Hopstock's (1993, p. 22) findings suggest state funds for LEP services are the primary source; however, in our calculations, other federal (e.g., Title VII) and local sources of funding are also included in this category.

Are teacher ratings of a LEP students' English proficiency related to the provision of ESL/bilingual instructional services in the subsequent year? The level of English proficiency of students with limited English proficiency ranges from those with little or no knowledge of the English language to students who are almost as proficient as students for whom English is their native language. To distinguish the different levels of LEP students' proficiency, teachers were asked to separately assess their LEP students' understanding, speaking, reading, and writing proficiency in English. For each of these skills, teachers were asked to categorize each student's English proficiency into one of five broad categories: excellent, good, fair, poor, or none. In other words, teachers were not asked to make precise estimates of their students' proficiency level. It is also a subjective measure and thus the implicit scale may vary across teachers (e.g., one teacher may rate a student as "excellent" while another teacher would have ranked the same student's proficiency as "good"). In our examination of this measure (see Appendix I), we found it to be a reliable measure of proficiency. For example, students' proficiency ratings were highly correlated with their ratings in other years (assessed by different teachers), the parent's English proficiency and use of English in the home, and with objective measures such as reading test scores.[25] Nevertheless, these categories contain a wide range of proficiency levels, both because there are only a few categories and because of some inter-teacher variation.

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[23] The range for Fleischman and Hopstock's results is due to nine percent of the students having instructional services categorized together as either "completely unknown" or "Special services for LEPs: Type unknown."

[24] This pattern could, in part, be an artifact of our data. The ESL/BE questionnaire was not administered in the Spring of 1994, hence one of our possible indicators of receipt of ESL/BE services is not available.

In sum, all the measures we examined showed the expected relationship with teacher ratings of English proficiency. The correlation with reading test scores is weak, but the association with other variables is strong. Based in part on this evidence we believe teacher ratings to be more than adequate for addressing questions in this report such as, "Are students with lower levels of English proficiency more likely to receive language-related services?" and "Do students who exit LEP status have higher levels of English proficiency than students who remain LEP?" However, because of the possibility of bias due to measurement error, we are less confident that teacher judgements provide accurate estimates of the percentage of LEP students at different levels of English proficiency.

We used these proficiency measures to address the question of whether the provision of ESL/bilingual instructional services is related to need. If so, we would expect that the lower the level of English proficiency, the more likely are students to receive language-related services. Exhibit 3.12 confirms this expectation. The exhibit compares teachers' assessments of LEP students' English language understanding and writing proficiency at the end of the school year to whether students receive ESL/Bilingual instructional services in the subsequent year. The

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[25] We did not use reading test scores as our measure of English proficiency, because they also measure cognitive ability and because, in each year, a large fraction of LEP students did not take the English-language test as part of the *Prospects* study.

Exhibit 3.12

Percent of LEP Students Receiving ESL/Bilingual Instructional Services by Prior Year Teachers' Rating of Students' English Understanding and Writing Proficiency

Received ESL/BE Services During Year	Excellent	Good	Fair	Poor or None
	Teachers' Ratings of Students' English Understanding Proficiency in Prior Year			
1st Grade Cohort				
Grade 2 (1993)	55.5%	79.3%	81.7%	97.6%
Grade 3 (1994)	38.6	74.9	91.9	96.8
3rd Grade Cohort				
Grade 4 (1992)	52.7%	68.4%	85.4%	89.0%
Grade 5 (1993)	47.7	71.8	80.8	90.9
Grade 6 (1994)	52.3	68.3	73.1	81.8
	Teachers' Ratings of Student's English Writing Proficiency in Prior Year			
1st Grade Cohort				
Grade 2 (1993)	36.5%	64.3%	86.5%	87.5%
Grade 3 (1994)	16.9	55.6	73.2	93.2
3rd Grade Cohort				
Grade 4 (1992)	33.2%	54.0%	78.2%	84.7%
Grade 5 (1993)	30.0	53.3	75.7	86.6
Grade 6 (1994)	49.4	48.5	73.1	80.1

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include only those students identified as LEP in the year prior to the year in row heading, i.e., the year in which the teacher rated the student's English language proficiency.

exhibit shows that teachers' assessments of their students' English proficiency is highly correlated with whether or not the student receives ESL/bilingual instructional services the following year.

The upper half of Exhibit 3.12 shows that about 97 percent of 1st grade cohort students and between 80 and 90 percent of 3rd grade cohort students who a teacher rated as having poor or no English understanding proficiency receive ESL/bilingual instructional services in the subsequent year. In contrast, depending on the grade and cohort, 38 to 55 percent of the students who are judged to have excellent English proficiency receive ESL/bilingual instruction in the subsequent year. The lower panel of the exhibit shows that an even larger difference in receipt of language services for different levels of teacher-assessed *writing proficiency*.[26]

The substantial portion of students with excellent English understanding and/or writing proficiency ratings that receive ESL/bilingual instruction in the following year are likely a diverse group. It includes students who are not yet ready for the same instructional services as their native English-speaking peers as well as fully English proficient students in developmental bilingual education programs.

In sum, the lower the teacher's assessment of a student's English proficiency, the more likely the student is to receive ESL/bilingual instructional services in the following year. Conversely, the higher the teacher's assessment of a student's English proficiency, the less likely the student is to receive ESL/bilingual instructional services in the following year. In other words, ESL/bilingual services are allocated according to perceived need. While this pattern is reassuring, it does not imply that the *amount* of language-related services is *adequate or inadequate*; the *Prospects* data cannot answer this question.

Are teacher ratings of LEP students' English Proficiency in the first year related to the number of subsequent years of ESL/bilingual instructional services? Here, we compare teacher ratings of LEP students' English understanding and writing proficiency in 3rd grade (1st grade for 1st grade cohort) to the receipt of ESL/bilingual instructional services in the following three years (two years for the 1st grade cohort). Like the analysis in the prior section which compared teacher ratings of English proficiency at the end of each year to the provision of ESL/bilingual instructional services in the following year, this is a general indication of whether provision of these services are related to the needs of LEP students. The difference here is that we calculate the number of years a student receives ESL/bilingual instructional services (rather than just services in the subsequent year) and we only use the teachers' ratings of English proficiency in the first year (rather than each year) because it provides the longest follow-up period. Another difference is that the sample for this analysis includes all students identified as LEP at any time during the Prospects study, not just in the year the teacher rated the students' English proficiency. We only have data on the provision of services in the three subsequent years (two for the 1st grade cohort), but previously cited literature on language development shows that it takes five to seven years for most LEP students to become fully proficient in English. It should also be noted that students in a two-way developmental bilingual program which teaches proficiency in English and a second language will continue to receive ESL/bilingual services even when they are fully proficient in English. Nevertheless, if in most programs ESL/bilingual instructional services are provided only to students who are not fully English proficient, we would expect students' English proficiency to be related to the number of subsequent years of ESL/BE services.

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[26] We also did analysis based upon teacher's ratings of student's English speaking and reading proficiency. Consistent with the degree of difficulty of these skills, the results using English speaking proficiency are similar to the results for English understanding proficiency and the results for English reading proficiency are virtually the same as the results for English writing proficiency.

Exhibits 3.13 (1st grade cohort) and 3.14 (3rd grade cohort) confirm this expectation: years of subsequent ESL/bilingual instruction is correlated with teacher ratings of English proficiency in the first year. The upper half of Exhibit 3.13 shows that nearly every LEP student (94 percent) who is rated as having poor or no English writing proficiency at the end of the 1st grade receives ESL/bilingual instructional services the following *two* years, with another 4 percent receiving ESL/bilingual instructional services for one more year during the study period.[27] In contrast, only 18.5 percent of LEP students rated as having excellent English understanding proficiency receive these services in both of the subsequent two years, suggesting

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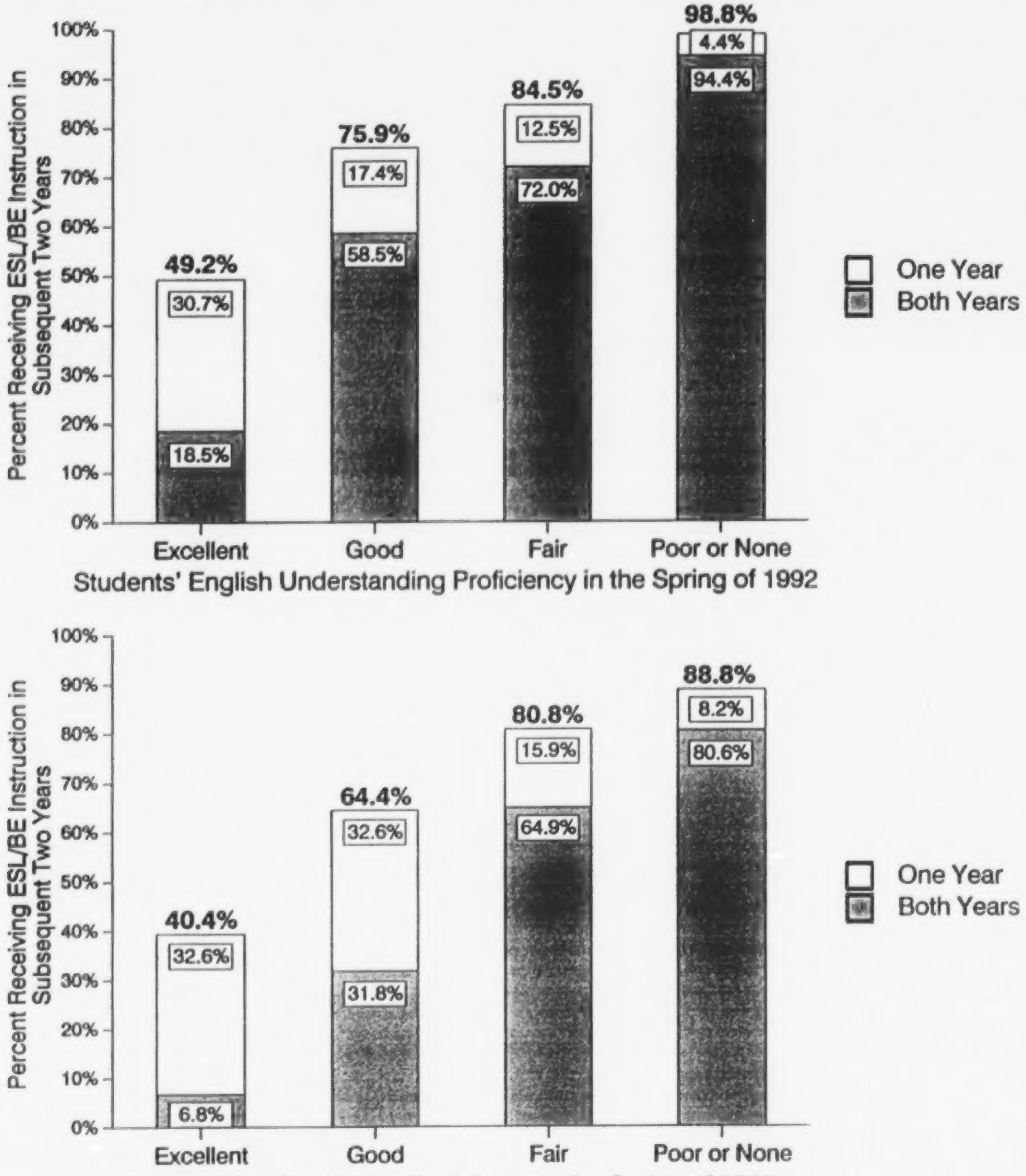
[27] The 94 percent figure suggests that up to 6 percent of these students may have transitioned out of language-related services by the 3rd grade. However, this fraction could be an overestimate for two reasons: (1) the student may receive ESL/bilingual services in later grades not covered by the *Prospects* study; and (2) students who receive ESL/bilingual instruction in one year could have received these services not in 2nd but in 3rd grade, so they may not have transitioned out of ESL/bilingual services by the 3rd grade. This caveat also applies for the rest of the analysis in this section on transitions out of ESL/bilingual instructional services.

Exhibit 3.13

Percent of LEP Students Who Received ESL/BE Instructional Services in 1992-93, and/or 1993-94 Academic Years by Teacher Rating of Students' English Proficiency in the Spring of 1992: 1st Grade Cohort



Note: In this exhibit, LEP students include all students identified as limited English proficient at any time during the survey period.

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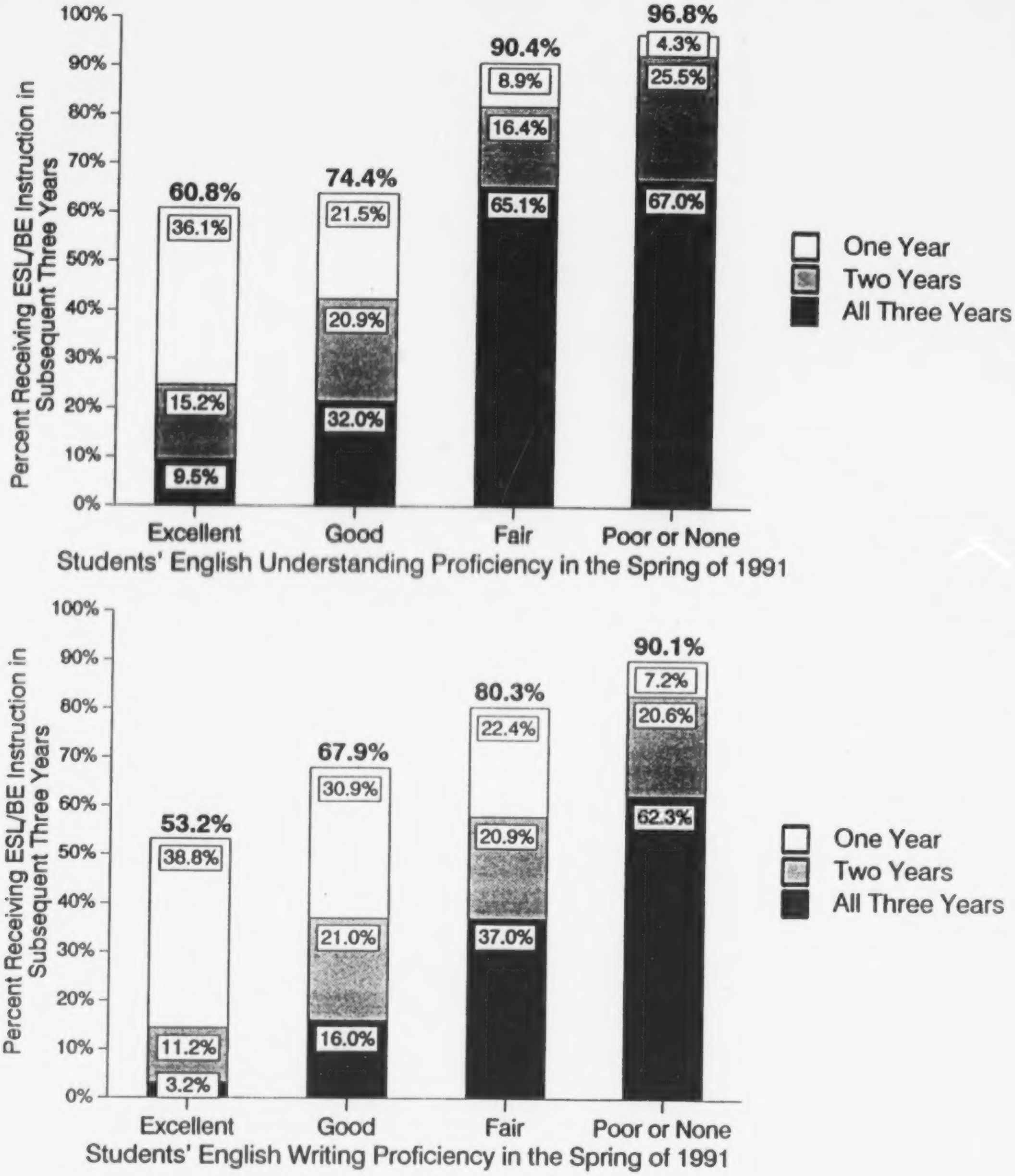
Exhibit 3.14

Percent of LEP Students Who Received ESL/BE Instructional Services in 1991-92, 1992-93, and/or 1993-94 Academic Years by Teacher Rating of Students' English Proficiency in the Spring of 1991: 3rd Grade Cohort



Note: In this exhibit, LEP students include all students identified as limited English proficient at any time during the survey period.

that a large fraction of these students have transitioned out of ESL/bilingual instructional services by the 3rd grade.

The bottom half of Exhibit 3.13 shows the relationship between teacher ratings of English *writing* proficiency and subsequent receipt of ESL/bilingual instructional services. It shows the same general pattern as was found for understanding proficiency: the more proficient the student is in the first year the less likely he or she is to receive ESL/bilingual instructional services in subsequent years. Writing proficiency in English is dependent upon a higher level of English language development than understanding proficiency, hence a rating of excellent English writing proficiency is usually a stronger indication of a high level of English language development than is a rating of excellent English understanding proficiency. For this reason we expect that a smaller proportion of the LEP students with high levels of English writing proficiency will subsequently receive ESL/BE services than we found for students with high levels of understanding proficiency. Our findings match this expectation. For example, only 7 percent of LEP students rated by their teacher as having excellent English writing proficiency in the 1st grade receive ESL/bilingual services by the 3rd grade, compared to 19 percent of the students rated as having excellent understanding proficiency.

Exhibit 3.14 shows the analogous relationship between teacher ratings of LEP students' English proficiency and subsequent receipt of ESL/bilingual instructional services for the 3rd grade cohort. For this cohort, we have the advantage of observing the services they receive for three years after the teachers rate their English proficiency. The findings for the 3rd grade cohort are the same as the 1st grade cohort, with the additional year of data showing a continuation of the trend found in the two years of data for the 1st grade cohort: the higher the teacher rating of LEP students' English proficiency, the fewer the subsequent years of ESL/bilingual instructional services.

The upper half of Exhibit 3.14 shows that 3 percent of LEP students rated as having little or no English understanding proficiency in the 3rd grade do not receive ESL/bilingual instruction in the 4th grade, whereas 39 percent of LEP students rated as having excellent understanding proficiency do not receive these services in the 4th grade. By the 6th grade, 33 percent of LEP students with little or no understanding proficiency in the 3rd grade are not receiving ESL/bilingual services, compared to 90 percent of LEP students with excellent understanding in proficiency in the 3rd grade. The bottom half of Exhibit 3.14 shows similar results for teacher ratings of students' English *writing* proficiency: almost 97 percent of the LEP students rated as having excellent English writing proficiency in the 3rd grade transitioned out of language-related services by the 6th grade.

In sum, the lower a student's level of English proficiency, the greater the number of subsequent years of ESL/bilingual instructional services. Like the findings in the previous section, this pattern indicates that ESL/bilingual services are allocated according to perceived need. Nevertheless, this analysis does not indicate whether the amount of language-related services is adequate or inadequate: the *Prospects* data cannot answer this question.

What proportion of LEP students' instruction is provided in a language other than English? For limited English proficient students, instruction in the native language may allow continuation of their cognitive development and subject mastery in step with their English proficient peers until their proficiency in English is sufficient to allow them to benefit fully from instruction in English. The optimal mix of instruction in a student's native language and in English is an open question, and probably varies across students depending on, among other things, their proficiency level in both languages, their prior education, and their parents' education and language proficiency.

The optimal mix also varies across instructional programs. For example, a developmental bilingual education program that seeks to build LEP and EP students' proficiency in both English and a second language may continue to provide instruction in both languages as students progress through school. In contrast, a program whose goal is to build LEP student proficiency only in English would decrease the amount of instruction in a language other than English as a student progresses through school.

The top half of Exhibit 3.15 shows that, in the 1st grade cohort, between 20 and 25 percent of instruction in regular math and reading/English/language arts classes is provided in a non-English language across all three grades.[28] The bottom half of Exhibit 3.15 shows that LEP students in the 3rd grade cohort receive about 20 percent of their instruction in a non-

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[28] Teachers were asked to estimate the percent of their class instruction that was conducted in students' non-English language(s). In classrooms where LEP students speak more than one non-English language, some (or all) of the non-English instruction will not be in the first language of particular LEP students.

Exhibit 3.15

Percent of LEP Students' Regular Classroom Instruction in a Language Other than English, by Subject, Grade, and Cohort

	Regular Reading/English/ Language Arts Class	Regular Math Class
1st Grade Cohort		
Grade 1 (1992)	25.2%	24.3%
Grade 2 (1993)	25.2	20.5
Grade 3 (1994)	24.9	21.3
3rd Grade Cohort		
Grade 3 (1991)	21.5%	18.0%
Grade 4 (1992)	18.9	19.9
Grade 5 (1993)	11.0	13.0
Grade 6 (1994)	13.2	8.2

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include only students identified as LEP in the year specified in the row heading.

English language in 3rd grade, but it decreases to between 8 and 13 percent by 5th and 6th grade. Reading/English/language arts instruction is somewhat more likely to be provided in a non-English language than math instruction at most grade levels.

As one would expect, the proportion of instruction in a non-English language by special Chapter 1 and ESL/BE instructors is somewhat higher (figures not shown in exhibit[29]) than for the regular classroom teachers examined here. This suggests that LEP students whose regular classroom teacher is supplemented by an additional Chapter 1 or ESL/BE instructor may receive more non-English instruction than indicated by Exhibit 3.15.

Is the proportion of instruction provided in a non-English language related to prior assessments of LEP students' English language proficiency? Before becoming proficient in English, students with limited English proficiency may need to have part or all of their instruction in their native language in order to keep pace with their native English-speaking peers in terms of content. As LEP students become proficient in English, they may be able to benefit fully from all or nearly all instruction in English, but may be taught some time in a language other than English to continue to develop and reinforce their bilingual skills. This study did not examine how the student's native language is used in the classroom. Native language instruction varies from teaching subject content in that language to providing instructions in the native language to help the students do their work in English. In practice, there are few pure models of how the students' native language is used in instruction.

In Exhibit 3.16, we examine the relationship between the amount of the regular reading/English/language arts instruction that is in a language other than English and the prior year teachers' assessments of students' English language understanding and writing proficiency.[30] Exhibit 3.16 shows two clear patterns. First, looking across the rows, it shows

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[29] As mentioned earlier, estimates for Chapter 1-funded teachers and aides and non-Chapter 1-funded ESL/BE teachers and aides are not reported in the text because data for these instructors have unusually high missing rates (between 20 and 60 percent), which creates a potential for bias. In addition, the relevant sample sizes are small.

[30] We present only the results based on teacher assessments of students' understanding and writing proficiency, because these two skills span the spectrum of English proficiency skills. Results (not shown) for teacher assessments of students' English speaking proficiency are similar to the results shown for English understanding proficiency, while results based on students' reading proficiency (not shown) are almost exactly the same as the results shown for English writing proficiency.

Exhibit 3.16

Percent of LEP Students' Regular Reading/English/Language Arts Classroom Instruction in a Language Other than English by Prior Year Teacher Ratings of LEP Students' English Understanding and Writing Proficiency

Average Percent of Regular Reading/ English/Language Arts Instruction in Language Other than English	Excellent	Good	Fair	Poor or None
	Teachers' Ratings of Students' English Understanding Proficiency in Prior Year			
1st Grade Cohort				
Grade 2 (1993)	4.0%	18.3%	29.1%	49.0%
Grade 3 (1994)	11.6	22.5	34.7	48.7
3rd Grade Cohort				
Grade 4 (1992)	8.2%	10.8%	18.9%	38.2%
Grade 5 (1993)	5.1	8.5	12.3	18.2
Grade 6 (1994)	6.6	11.3	14.6	20.2
	Teachers' Ratings of Students' English Writing Proficiency in Prior Year			
1st Grade Cohort				
Grade 2 (1993)	1.9%	3.9%	19.0%	41.3%
Grade 3 (1994)	7.4	20.9	16.5	41.1
3rd Grade Cohort				
Grade 4 (1992)	2.0%	6.7%	15.0%	28.4%
Grade 5 (1993)	3.7	5.3	9.7	15.4
Grade 6 (1994)	4.9	7.8	13.4	15.1

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include only those students identified as LEP in the year prior to the year in the row heading, i.e., the year in which the teacher rated the student's English language proficiency.

that the lower the teachers' assessment of the students' English understanding or writing proficiency, the more of the subsequent year's instruction that is provided in a language other than English. For example, the first row of the exhibit shows that LEP students who are rated as having excellent English understanding proficiency while in the first grade receive, on average, only four percent of their instruction in a language other than English in the following year. Students who are rated as having poor or no English reading proficiency in the first grade receive an average of 49 percent of their instruction in a language other than English in the following year. These results suggest that the amount of native language instruction provided is related to need.

The second pattern evident from Exhibit 3.16 is that for students with the lowest ratings of English understanding or writing proficiency, poor or none (the last column of the exhibit), the amount of instruction in a language other than English declines as the elementary school grade level rises. For example, looking down the last column of the exhibit, an average of nearly 49 percent of instruction is in a language other than English in the second grade for students rated as having poor or no English understanding proficiency in the prior year, while in the sixth grade, an average of only 20 percent of the instruction is in a language other than English for similarly rated students in the prior year. This may reflect changes in instruction or be an indication that the scale on which teachers rate students' English proficiency is higher for the higher grades, so that students in the later elementary grades with low ratings of English understanding or writing proficiency can still benefit from instruction in English.

Do LEP students receive supplementary assistance funded by Chapter 1 in math and reading/English/language arts? In Chapter 2, we found that 85 percent of LEP students are from families with incomes below 185 percent of the poverty line and nearly three out of four attend schools where more than half of the students are eligible for free or reduced-price lunches. These measures of economic disadvantage suggest that many LEP students will be eligible for and in need of supplementary services funded through the Chapter 1 program or other supplementary programs.[31] Indeed, Exhibit 3.11 showed that a substantial proportion of students identified as limited English proficient in a particular year receive ESL/BE instruction funded by Chapter 1. We explore this issue further in Exhibits 3.17 and 3.18 by looking at funding sources for other types of supplementary instruction.

Exhibit 3.17 contains LEP students' grade-by-grade participation rates in reading/English/ language arts supplementary assistance, while Exhibit 3.18 does the same for supplementary math assistance. Befitting their limited English language proficiency, we see that LEP students are more likely to receive supplementary assistance in reading/English/language arts than in math. Depending on the year and grade, between 25 and 47 percent of students identified as LEP in a particular year participate in supplemental Chapter 1 reading/English/language arts instruction (see Exhibit 3.17), whereas only 18 to 37 percent participate in Chapter 1 math programs (Exhibit 3.18). An additional 4 to 13 percent are enrolled in schools operating as a Chapter 1 schoolwide program.[32]

It is clear from the exhibits that the Chapter 1 program is a primary source of funding for supplemental services[33] for LEP students in both math and reading/English/language arts. On average, over eight times as many LEP students receive supplemental services in these core subjects funded by Chapter 1 than funded by other sources. In addition, an average of nine percent of LEP students are in schools operating as a Chapter 1 schoolwide program.

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[31] Puma et al. (1997) report the Chapter 1 program operated as follows at the time of the study in the early 1990s:

> *The U.S. Department of Education distributed Chapter 1 funds directly to counties based on the number of poor children aged 5-17 identified in the decennial census, with an adjustment using a state average per-pupil expenditure factor intended to recognize the cost of living differences across states. The money was then suballocated to school districts in proportion to the number of children from low-income families in each district. Within the school district, a school was eligible for Chapter 1 assistance if its attendance area had a poverty rate that was relatively high for that district. In general, districts selected the schools that ranked highest in poverty, but the law allowed districts several alternatives to a strict ranking. Finally, within selected schools, individual students were selected for services on the basis of their educational need, rather than on the basis of their parents' financial status.* (p.6).

[32] Because of the nature of schoolwide programs, the fungibility of Chapter 1 funding, and the lack of detailed financial data, we cannot determine which types of services students receive as a result of the Chapter 1 Schoolwide program. Since Chapter 1 Schoolwide funds can be used to enhance *all* curricula, we count these students as participating in *both* supplementary reading/English/language arts instruction and supplementary math instruction.

[33] In this chapter, supplemental services are defined as services funded by supplemental sources, such as compensatory education programs like Chapter 1 or programs targeted for students with special instructional needs such as Title VII (targeted to LM students), and services provided to students with special needs such as state funded remedial math or special education services.

Exhibit 3.17

Percent of LEP Students Receiving Supplementary Instruction in Reading/English/Language Arts, by Source of Funding, Grade, and Cohort

	Schoolwide Chapter 1 Participant	Chapter 1 Participant	Non-Chapter 1 Participant	Non-Participant
1st Grade Cohort				
Grade 1 (1992)	6.7%	34.6%	2.3%	56.4%
Grade 2 (1993)	10.5	30.2	3.3	55.9
Grade 3 (1994)	11.1	27.7	6.1	55.1
3rd Grade Cohort				
Grade 3 (1991)	3.8%	25.2%	4.9%	66.0%
Grade 4 (1992)	5.7	46.9	5.7	41.7
Grade 5 (1993)	13.1	42.9	3.1	40.8
Grade 6 (1994)	9.9	36.9	8.4	44.9

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include only students identified as LEP in the year specified in the row heading.

Exhibit 3.18

Percent of LEP Students Participating in Supplementary Instruction in Math, by Source of Funding, Grade, and Cohort

	Schoolwide Chapter 1	Chapter 1 Participant	Non-Chapter 1 Participant	Non-Participant
1st Grade Cohort				
Grade 1 (1992)	6.7%	19.8%	2.1%	71.4%
Grade 2 (1993)	10.5	21.0	1.4	67.1
Grade 3 (1994)	11.1	18.1	5.0	65.8
3rd Grade Cohort				
Grade 3 (1991)	3.8%	19.9%	4.0%	72.3%
Grade 4 (1992)	5.7	37.0	5.2	52.2
Grade 5 (1993)	13.1	33.8	2.5	50.5
Grade 6 (1994)	9.9	32.4	7.1	50.5

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include only students identified as LEP in the year specified in the row heading.

The exhibits also show a general upward trend in the proportion of LEP students who receive supplementary services in core subjects as they progress through elementary school. For example, 44 percent of LEP students receive supplemental reading/English/language arts instruction from all sources in 1st grade in 1991, while 55 percent of LEP students in 6th grade in 1994 receive supplemental reading/English/language arts instruction. These trends may indicate that the students who continue to be identified as LEP by school staff as they progress through school are the more economically and educationally needy students and therefore most often in need of supplemental instruction. This upward trend in the percentage of LEP students in the later grades who receive supplemental services may also indicate the rising cognitive demands of coursework in content areas in higher grades, or instructional failure in the earlier grades.

In summary, Chapter 1 is a major source of funding for supplemental services for LEP children. Averaged across grades and cohorts, Chapter 1 funds supplementary instruction for about one-fourth of LEP students in ESL/BE instruction, for one-third in math instruction, and for over two-fifths in reading/English/language arts instruction (see Exhibits 3.11, 3.17, and 3.18). Overall, the *Prospects* data indicate that during the survey period over 60 percent of the 1st grade cohort students received some type of instruction funded by Chapter 1 and 70 percent of the 3rd grade cohort received Chapter 1 funded instruction (figures not shown in exhibit). In addition, the importance of Chapter 1 in providing critical instructional services to LEP students has probably grown since the last year of the survey, 1994, because of changes in the Chapter 1 program (now called Title I). Schools are no longer required to distinguish between limited English language proficiency and educational deprivation when providing Chapter 1 services, which is expected to lead to greater participation of LEP students in Title I (see Anstrom 1995, Hoff 1997).[34]

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[34] Anstrom (1995) explains the change as follows:

> *The previous Chapter 1 law required that programs distinguish between educational deprivation and limited English proficiency when determining eligibility for programming (Section 1014 [d][1]). The new legislation eliminates this requirement thus paving the way for greater inclusion of LEP students in Title I services.* (p. 4)

Does the emphasis on reading skills vary by a LEP student's English language reading proficiency? Does it vary by the student's native language reading proficiency? Here, we address one of the most fundamental topics in educational practice: Do students receive *instructional services* in the classroom that are responsive to their *educational needs*? To address this question, we compare the teacher's report of the reading skills that are emphasized in his or her classroom (i.e., instructional service) with the rating of the student's English and native language reading proficiency by the student's primary teacher in the *previous* year (i.e., educational need). This analysis is undertaken for students identified as LEP while in the 4th grade in 1992, based on proficiency ratings from the previous year.[35]

Factor analysis was used to summarize general categories of skills emphasized by individual teachers, based on their responses to the degree of emphasis placed on 25 skills a teacher might emphasize in a 4th grade reading/English/language arts classroom. (See Appendix E for a discussion of factor analysis methods and results.) We identified two primary factors related to reading skills, which we labelled Reading Attitudes and Reading Comprehension. Composite scores were formed for both of these factors by averaging the teacher's response to the amount of emphasis he or she gives to the skills associated with each factor. *Reading Attitudes* is composed of three items that measure the emphasis a teacher places on the students' confidence and appreciation of reading.[36] *Reading Comprehension* is composed of seven items that indicate the degree to which the teacher emphasizes students' comprehension of facts and details from their reading as well as their ability to draw inferences and separate fact from opinion. Together, these two variables capture the emphasis a teacher places on reading skills in the 4th grade.

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[35] We chose to do this analysis for the 3rd grade cohort using 1991 proficiency ratings and 1992 instructional emphases because each of the other combinations of consecutive years of data had a drawback in one of the two measures. We did not use the 1992 proficiency rating/1993 instructional emphasis in the *Prospects* sample because the 1993 question on instructional emphasis is a binary variable—teach/do not teach and hence the items did not fit the factors used in the factor analysis (see below) as well for that year. Similarly, we did not use the 1993 proficiency rating/1994 instructional emphasis because the question on native language proficiency was only on the survey in 1991 and 1992. The 1st grade cohort was not in the survey in the Spring of 1991, hence, we could only do the 1991/1992 analysis for the 3rd grade cohort.

[36] The *Reading Attitudes* factor is a composite score based on the degree of emphasis the teacher reports placing on: developing an appreciation for reading and the desire to read; developing student' confidence in their ability to read; and improving students' understanding of the value of reading in everyday life. See Appendix E for details on the factor analysis methods and results.

Exhibit 3.19 shows the relationship between LEP students' reading proficiency ratings in 3rd grade and the level of emphasis their reading/English/language arts teachers place on Reading Attitudes in the 4th grade. As can be seen, the teachers' emphasis on Reading Attitudes does not vary much with either the English or native language reading proficiency rating of LEP students. Regardless of students' proficiency level, about nine out of ten LEP students are in classes where the regular reading/English/language arts teacher places major emphasis on skills associated with Reading Attitudes.

On the other hand, Reading Comprehension, which embodies more advanced reading skills, is clearly not emphasized as much by the teachers of LEP students with poor or no English reading proficiency (see top panel of Exhibit 3.20). Only one-third of the LEP students rated as having poor or no English proficiency in the prior year have teachers that place major emphasis on Reading Comprehension, compared to over half of other LEP students. Ratings of native language proficiency are not correlated with the emphasis teachers place on Reading Comprehension, however (see bottom panel of Exhibit 3.20).

Does the emphasis on writing skills vary with a LEP student's English language writing proficiency? Does it vary with the student's native language writing proficiency? Here we compare teachers' reports of writing skills that are emphasized in their classes with the rating of LEP students' English and native language writing proficiency by the child's regular classroom teacher in the previous year.

Using the procedure described above for reading skills, we created one composite score, labelled Writing Attitudes/Skills, that measures the emphasis a teacher places on basic writing skills in the 4th grade. *Writing Attitudes/Skills* is composed of six items that a teacher might emphasize, including grammar, spelling, and developing students' confidence and appreciation for writing.

Exhibit 3.21 shows the relationship between the emphasis on Writing Attitudes/Skills in the 4th grade (in the Spring of 1992) and students' prior-year ratings of English and native language writing proficiency. As can be seen in the upper panel of the exhibit, LEP students rated as having excellent English writing proficiency are less likely to be in classes where Writing Skills/Attitudes are a major emphasis the following year. Only 31 percent of these students are in such classes, compared to nearly half of all other LEP students. Conversely, the higher the

Exhibit 3.19

Emphasis on Reading Attitudes by LEP Students' Regular Reading/English/Language Arts Teachers in Spring 1992, by Spring 1991 Teacher Ratings of Students' English and Native Language Reading Proficiency, 4th Grade

Emphasis on Reading Attitudes (i.e., Confidence and Appreciation) in Spring 1992	Excellent	Good	Fair	Poor or None
	Teachers' Ratings of Students' English Reading Proficiency, Spring 1991			
Little or No Emphasis	0.0%	0.0%	0.5%	0.0%
Moderate Emphasis	9.5	14.2	11.6	6.9
Major Emphasis	90.6	85.9	87.9	93.1
	Teachers' Ratings of Students' Native Language Reading Proficiency, Spring 1991			
Little or No Emphasis	0.0%	0.0%	0.0%	0.5%
Moderate Emphasis	0.3	14.7	11.2	9.1
Major Emphasis	99.7	85.3	88.8	90.4

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include only students identified as LEP in 1992.

Exhibit 3.20

Emphasis on Reading Comprehension by LEP Students' Regular Reading or English/Language Arts Teachers in Spring 1992, by Spring 1991 Teacher Rating of Students' English and Native Language Reading Proficiency, 4th Grade

Emphasis on Reading Comprehension in Spring 1992	Excellent	Good	Fair	Poor or None
	Teachers' Rating of Students' English Reading Proficiency, Spring 1991			
Little or No Emphasis	1.0%	0.8%	1.0%	0.9%
Moderate Emphasis	55.7	40.4	43.0	67.7
Major Emphasis	43.2	58.8	56.0	31.4
	Teachers' Rating of Students' Native Language Reading Proficiency, Spring 1991			
Little or No Emphasis	0.0%	1.4%	0.6%	1.2%
Moderate Emphasis	50.8	53.2	53.8	50.9
Major Emphasis	49.2	45.4	45.6	47.9

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include only students identified as LEP in 1992.

Exhibit 3.21

Emphasis on Writing Attitudes/Skills by LEP Students' Regular Reading/English/Language Arts Teachers in Spring 1992, by Spring 1991 Teacher Rating of Students' English and Native Language Writing Proficiency, 4th Grade

Emphasis on Writing Attitudes/Skills, Spring 1992	Excellent	Good	Fair	Poor or None
	Teachers' Ratings of Students' English Writing Proficiency, Spring 1991			
Little or No Emphasis	5.3%	0.6%	2.0%	2.0%
Moderate Emphasis	63.5	49.8	46.2	50.3
Major Emphasis	31.3	49.7	51.8	47.7
	Teachers' Ratings of Students' Native Language Writing Proficiency, Spring 1991			
Little or No Emphasis	1.5%	1.6%	1.9%	2.8%
Moderate Emphasis	42.3	43.6	50.6	56.7
Major Emphasis	56.2	54.8	47.5	40.5

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include only students identified as LEP in 1992.

students' native language writing proficiency (bottom panel), the greater the likelihood of being in a class with major emphasis on Writing Attitude/Skills. Here, about 41 percent of LEP students rated as having poor or no writing proficiency in their native language are in reading/English/language arts classes that placed major emphasis on Writing Attitudes/Skills, compared to over half of the other students.

Overall, our findings on the responsiveness of 4th grade instruction to the 3rd grade English and native language proficiency of LEP students reveal some interesting patterns. Surprisingly, LEP students rated as having poor English reading proficiency in 3rd grade are *less* likely to be in a 4th grade class that places major emphasis on Reading Comprehension than are other LEP students. It may be that the higher level reading skills represented by the Reading Comprehension measure are seen as an inappropriate area of emphasis for students still struggling with the basics of reading in English. A similar pattern arises regarding native language *writing* proficiency: LEP students rated as having poor native language writing proficiency in the 3rd grade are less likely than other students to be in a 4th grade class that emphasizes Writing Attitudes/Skills. Finally, LEP students rated as having excellent English writing proficiency in the 3rd grade are *less* likely to be in a class that emphasizes Writing Attitudes/Skills in the 4th grade, perhaps because the skills have already been amply developed.

DO LEP STUDENTS AT HIGH-POVERTY SCHOOLS RECEIVE THE SAME QUALITY OF EDUCATIONAL INPUTS AS EP STUDENTS AT HIGH-POVERTY SCHOOLS?

To further examine the types of instruction received by LEP students, we next compare the general educational inputs of LEP students with EP students on a number of dimensions for 3rd and 6th graders in the 1993-94 academic year, including the education and experience of regular classroom teachers and aides, class size, and the availability of instructional materials. Generally, these variables reveal something about the quality of instructional inputs provided to LEP and EP students alike. For this analysis, LEP students from high-poverty schools are compared to EP students from high-poverty schools. As discussed earlier in the chapter, a high-poverty school is defined to be a school where at least 50 percent of the student body is eligible for free or reduced-price lunches.

Are the regular classroom reading/English/language arts and math teachers of LEP students as educated and experienced as the regular classroom teachers of EP students?

We begin by considering the education and experience of students' primary classroom teachers and aides. We also look in this section at teachers' standard certification levels, as a further indicator of instructional quality.

Do LEP students' reading and math teachers have the same educational background as teachers of EP students? The highest academic degree attained by a teacher is one measure of the quality of instructional services provided to students. As Exhibits 3.22 and 3.23 show, in high-poverty schools, there is no substantial difference in the educational attainment of LEP students' and EP students' regular classroom teachers (reading\English\language arts or math) for either cohort. On this indicator of instructional quality, LEP students and EP students appear similar.

Do LEP students' regular reading and math aides have the same educational background as EP students' aides?[37] Exhibits 3.24 and 3.25 show the patterns of educational attainment for classroom aides. In the 1st grade cohort, the aides in the regular reading/English/reading arts classrooms of 3rd grade LEP students appear to have had less formal education than the aides in EP students' classrooms. In particular, only about 13 percent of the reading instructional aides in LEP students' regular classrooms had at least some college education, compared to nearly 30 percent for their EP counterparts in similarly economically disadvantaged schools. The opposite pattern appears to hold for 6th grade students in 1994 (3rd grade cohort), where LEP students' aides appear more likely to have some college training relative to EP students' aides. Results for math classroom aides are similar (see Exhibit 3.25).

Do LEP students' reading and math teachers have the same amount of teaching experience as EP students' teachers? Teaching experience is a second dimension by which to gauge the quality of teachers providing regular instruction to LEP and EP students. More experienced teachers have presumably had time to fine-tune effective teaching methods to meet the needs of the various students enrolled in their class. As can be seen in

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[37] The sample sizes (not shown in the exhibit) for classroom aides' education are quite small (less than 50) for some cells; the results therefore need to be interpreted cautiously.

Exhibit 3.22

Educational Attainment of Students' Regular Reading/English/Language Arts Teachers in the Spring of 1994, by Cohort, School Poverty, and Students' English Proficiency

Highest Academic Degree	High-Poverty Schools, LEP Students	High-Poverty Schools, EP Students	All Other Schools, LEP and EP Students
1st Grade Cohort (3rd Grade)			
Bachelor's Degree	20.3%	24.8%	22.8%
Beyond Bachelor's Degree, but no Graduate Degree	46.7	42.1	41.4
Master's Degree	29.2	28.8	30.0
More than Master's Degree	3.8	4.4	5.8
3rd Grade Cohort (6th Grade)			
Bachelor's Degree	11.9%	18.1%	21.6%
Beyond Bachelor's Degree, but no Graduate Degree	50.1	47.8	35.8
Master's Degree	33.3	28.3	35.9
More than Master's Degree	4.7	5.8	6.7

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include all students identified as limited English proficient at any time during the survey period.

Exhibit 3.23

Educational Attainment of Students' Regular Math Teachers in the Spring of 1994, by Cohort, School Poverty, and Students' English Proficiency

Highest Academic Degree	High-Poverty Schools, LEP Students	High-Poverty Schools, EP Students	All Other Schools, LEP and EP Students
1st Grade Cohort (3rd Grade)			
Bachelor's Degree	18.7%	25.6%	23.5%
Beyond Bachelor's Degree, but no Graduate Degree	47.1	42.1	40.0
Master's Degree	30.9	28.1	30.5
More than Master's Degree	3.4	4.2	6.1
3rd Grade Cohort (6th Grade)			
Bachelor's Degree	15.1%	23.8%	19.0%
Beyond Bachelor's Degree, but no Graduate Degree	55.2	39.5	35.3
Master's Degree	24.8	29.2	41.6
More than Master's Degree	4.9	7.5	4.2

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include all students identified as limited English proficient at any time during the survey period.

Exhibit 3.24

Educational Attainment of Students' Regular Reading/English/Language Arts Classroom Aides in the Spring of 1994, by Cohort, School Poverty, and Students' English Proficiency

Highes Academic Degree	High-Poverty Schools, LEP Students	High-Poverty Schools, EP Students	All Other Schools, LEP and EP Students
1st Grade Cohort (3rd Grade)			
Less than H.S. Degree	2.3%	1.9%	0.7%
H.S. Degree	84.3	67.0	41.7
Some College	4.5	15.7	19.9
Bachelor's Degree	6.6	9.8	33.6
Master's Degree or Higher	2.3	4.7	4.1
3rd Grade Cohort (6th Grade)			
Less than H.S. Degree	2.4%	0.8%	0.0%
H.S. Degree	64.9	76.4	49.7
Some College	14.4	10.6	22.4
Bachelor's Degree	14.4	8.9	17.1
Master's Degree or Higher	4.0	3.3	10.8

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include all students identified as limited English proficient at any time during the survey period.

Exhibit 3.25

Educational Attainment of Students' Regular Math Classroom Aides in the Spring of 1994, by Cohort, School Poverty, and Students' English Proficiency

Highest Academic Degree	High-Poverty Schools, LEP Students	High-Poverty Schools, EP Students	All Other Schools, LEP and EP Students
1st Grade Cohort (3rd Grade)			
Less than H.S. Degree	3.1%	2.7%	0.0%
H.S. Degree	83.7	65.1	41.6
Some College	5.3	14.5	19.0
Bachelor's Degree	6.3	11.3	24.4
Master's Degree or Higher	1.7	6.5	15.1
3rd Grade Cohort (6th Grade)			
Less than H.S. Degree	4.5%	2.7%	0.0%
H.S. Degree	65.0	81.6	56.6
Some College	24.7	8.7	25.8
Bachelor's Degree	5.9	7.1	14.7
Master's Degree or Higher	0.0	0.0	2.8

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include all students identified as limited English proficient at any time during the survey period.

Exhibits 3.26 and 3.27, LEP students in high-poverty schools are consistently, across subject and cohort, more likely to have teachers with less than 10 years of experience than EP students at high-poverty schools. A somewhat more tenuous, but noticeable pattern is that LEP students' teachers are more likely than EP students' teachers to be in their first year of teaching (with the exception of 6th grade reading).

Are LEP students' teachers as likely as EP students' teachers to have a permanent standard teaching certification? A final indicator of teacher quality, having a permanent standard teaching certificate, varies little by students' English proficiency.[38] Exhibit 3.28 shows that about 90 percent of teachers meet this minimal training and competency requirement. There is no substantial difference in the acquisition of permanent teaching certificates between LEP students' and EP students' teachers for either reading or math teachers.

How does the regular classroom instructional setting for LEP students compare to the regular classroom instructional setting of EP students?

Settings, as well as teachers, can influence instructional results. Here, we compare LEP and EP students in terms of class size and ability grouping as the primary measures of instructional setting.

Are LEP students in smaller or larger classes than EP students? Smaller class sizes allow the teacher to provide more individual instruction and feedback to each student, and oblige students to participate more in classroom activities. A recent review of the Tennessee study of classroom size found that being in classes with fewer than 17 students in the early elementary grades is correlated with better cognitive outcomes in later grades (Mosteller 1995). The individual attention and encouragement to participate that smaller classes allow may be especially important for limited English proficient students.

Exhibit 3.29 (reading/English/language arts) and 3.30 (math) show the average class sizes and the percent of students attending classes with fewer than 18 students, between 18 and 25 students, and 26 or more students. The most striking finding is that in high-poverty schools, LEP

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[38] In the *Prospects* survey, teachers without teaching certificates were not asked whether they were working toward a teaching certificate. School administrators were not asked whether the scarcity of certified teachers led them to hire uncertified teachers.

Exhibit 3.26

Teaching Experience of Students' Regular Reading/English/Language Arts Teachers in the Spring of 1994, by Cohort, School Poverty, and Students' English Proficiency

Years of Teaching Experience	High-Poverty Schools, LEP Students	High-Poverty Schools, EP Students	All Other Schools, LEP and EP Students
1st Grade Cohort (3rd Grade)			
First Year	8.0%	3.2%	3.1%
Two to Five Years	18.9	14.5	13.0
Six to Ten Years	24.7	18.6	14.2
Eleven to Fifteen Years	23.0	27.7	19.3
Sixteen to Twenty Years	9.7	16.5	20.2
>20 Years	15.7	19.5	30.2
3rd Grade Cohort (6th Grade)			
First Year	5.2%	6.7%	4.3%
Two to Five Years	15.4	14.4	17.2
Six to Ten Years	20.9	17.3	17.5
Eleven to Fifteen Years	28.5	23.6	25.4
Sixteen to Twenty Years	14.6	19.6	13.9
>20 Years	15.5	18.4	21.8

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include all students identified as limited English proficient at any time during the survey period.

Exhibit 3.27

Teaching Experience of Students' Regular Math Teachers in the Spring of 1994, by Cohort, School Poverty, and Students' English Proficiency

Years of Teaching Experience	High-Poverty Schools, LEP Students	High-Poverty Schools, EP Students	All Other Schools, LEP and EP Students
1st Grade Cohort (3rd Grade)			
First Year	7.3%	3.1%	2.8%
Two to Five Years	22.6	14.4	14.1
Six to Ten Years	18.8	18.7	14.2
Eleven to Fifteen Years	22.5	27.7	19.6
Sixteen to Twenty Years	13.4	16.5	19.5
>20 Years	15.5	19.7	30.0
3rd Grade Cohort (6th Grade)			
First Year	7.9	5.3	4.9
Two to Five Years	18.5	15.1	14.0
Six to Ten Years	18.7	14.1	14.9
Eleven to Fifteen Years	24.1	19.7	20.6
Sixteen to Twenty Years	18.9	22.4	20.6
>20 Years	11.9	23.3	25.0

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include all students identified as limited English proficient at any time during the survey period.

Exhibit 3.28

Percent of Students' Regular Reading/English/Language and Math Teachers in the Spring of 1994 Who Have a Permanent, Standard Teaching Certificate in the State that They Teach, by Cohort, School Poverty, and Students' English Proficiency

	High-Poverty Schools, LEP Students	High-Poverty Schools, EP Students	All Other Schools, LEP and EP Students
1st Grade Cohort (3rd Grade)			
Reading/English/Language Arts Teacher	87.0%	95.4%	94.7%
Math Teacher	87.2	95.4	95.1
3rd Grade Cohort (6th Grade)			
Reading/English/Language Arts Teacher	88.9%	94.1%	94.4%
Math Teacher	88.8	93.2	94.5

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include all students identified as limited English proficient at any time during the survey period.

Exhibit 3.29

Average and Distribution of Reading/English/Language Arts Class Size for Students in the Spring of 1994, by Cohort, School Poverty, and Students' English Proficiency

Number of Students in Class	High-Poverty Schools, LEP Students	High-Poverty Schools, EP Students	All Other Schools, LEP and EP Students
1st Grade Cohort (3rd Grade)			
Less than 18	20.8%	11.9%	12.1%
18 to 25	38.0%	63.8%	61.6%
26 or more	41.2%	24.3%	26.3%
Average class size	*23.5*	*22.5*	*22.4*
3rd Grade Cohort (6th Grade)			
Less than 18	10.4%	10.8%	9.5%
18 to 25	25.6%	46.4%	51.7%
26 or more	64.1%	42.9%	39.8%
Average class size	*25.9*	*24.5*	*24.4*

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include all students identified as limited English proficient at any time during the survey period.

Exhibit 3.30

Average and Distribution of Math Class Size for Students in the Spring of 1994, by Cohort, School Poverty, and Students' English Proficiency

Number of Students in Class	High-Poverty Schools, LEP Students	High-Poverty Schools, EP Students	All Other Schools, LEP and EP Students
1st Grade Cohort (3rd Grade)			
Less than 18	16.8%	9.9%	9.6%
18 to 25	38.1%	65.1%	31.7%
26 or more	45.1%	25.0%	41.3%
Average class size	*23.9*	*22.8*	*22.9*
3rd Grade Cohort (6th Grade)			
Less than 18	8.2%	9.5%	6.5%
18 to 25	23.1%	45.6%	50.1%
26 or more	68.7%	44.9%	43.4%
Average class size	*26.9*	*24.6*	*24.7*

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include all students identified as limited English proficient at any time during the survey period.

students are one and a half times more likely than EP students to be in the largest classes, despite the special needs of low- income limited English proficient students. In 3rd grade (1st grade cohort in 1994), over two-fifths of LEP students attended English and math classes with more than 26 students whereas only one-fourth of EP students were in classes that large. The estimates for 6th graders (3rd grade cohort in 1994) are equally striking: two-thirds of LEP students are in the largest classes, but less than half of the EP students are in classes that large. Surprisingly and more encouraging, LEP students in the 1st grade cohort are also almost twice as likely to be in classes with fewer than 18 students, classroom sizes the Mosteller study found to be associated with better cognitive outcomes in later grades. EP students in the 3rd grade cohort are as likely as LEP students to be in classes with fewer than 18 students.

Are LEP students more likely than EP students to be enrolled in classes based on ability? Grouping students in classes based on ability—while beneficial for other reasons—may be a detriment to low-achieving students to the extent that it results in lower academic expectations and stigmatizes low-achieving students. On the other hand, grouping students based on ability may stimulate higher-ability students, provide all students with instruction appropriately targeted for their ability level, and keep lower-ability students from becoming discouraged. In some cases, short term grouping by ability or pullout instruction (such as Reading Recovery) may also be an effective option to bring students up to speed in subjects they would have a hard time catching up on in a regular setting.

Students' regular math and reading teachers were asked if students were enrolled in their class based on ability. Their responses are summarized in Exhibit 3.31. LEP students in high-poverty schools were more likely than EP students in high-poverty schools to be in reading/English/language art classes that enrolled students based on ability. In 3rd grade, LEP students were grouped by ability in their reading classes 34 percent of the time, while EP students were grouped by ability 24 percent of the time. A similar pattern holds for 3rd grade math classes, where 26 percent of LEP students and 17 percent of EP students were enrolled in classes based on ability.

For the 3rd grade cohort, the likelihood of being grouped by ability in the 6th grade is similar for EP and LEP students in high-poverty schools.

Exhibit 3.31

Percent of Students that are Enrolled in Reading/English/Language Arts and Math Classes Based on Ability in the Spring of 1994, by Cohort, School Poverty, and Students' English Proficiency

	High-Poverty Schools, LEP Students	High-Poverty Schools, EP Students	All Other Schools, LEP and EP Students
1st Grade Cohort (3rd Grade)			
Reading/English/Language Arts Class	34.1%	24.1%	23.9%
Math Class	26.1	16.6	14.3
3rd Grade Cohort (6th Grade)			
Reading/English/Language Arts Class	40.2%	35.6%	20.2%
Math Class	24.7	27.5	22.7

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include all students identified as limited English proficient at any time during the survey period.

Do LEP students have the same access to material resources as EP students in the regular reading/English/language arts and math classrooms?

A final indicator of instructional quality concerns access to physical resources, such as instructional materials and computers.

Do students' regular teachers believe that they have sufficient materials to meet their students' instructional needs? The regular math and reading teachers of all students in the *Prospects* survey were asked whether they believed they had sufficient instructional materials to meet most students' instructional needs. Their responses are summarized in Exhibit 3.32. In high-poverty schools, both LEP and EP students' teachers are equally likely to report that they do not have sufficient materials for instruction: around one-fourth report insufficient materials. Students in higher income schools (i.e., all other students) are a little better off; only 15 percent of their teachers report that they do not have sufficient instructional materials to meet most of their students' needs.

Are there differences between LEP and EP students in the availability of computers for instructional purposes? Computers and related instructional materials are a costly investment for schools, but computers have become a vital educational tool. Introducing computers to students at a young age, and utilizing computer programs as teaching tools is important in its own right, but also may be a general indicator of the quality of physical resources available to students in the classroom.

We examined several measures of the availability of computers in the students' regular reading and math classes: teachers' reports on whether sufficient computers and computer software are available for instruction, and the number of computers available to the class. These measures are reported in Exhibit 3.33 (reading/English/language arts) and Exhibit 3.34 (math). Taken together, all of these measures indicate that in high-poverty schools LEP students have slightly but uniformly *better* access to computers than EP students. For example, 6th grade LEP students are in classrooms with access to an average of 8.5 computers for both reading and math while EP students have access to an average of only 6.9 computers per class for reading and 6.3 computers for math. The modestly larger class sizes attended by LEP students in high-poverty schools (shown earlier in Exhibits 3.29 and 3.30) offset some of the advantage of having more computers available per class. These results on the availability of computers are also an

Exhibit 3.32

Percent of Students With Reading/English/Language Arts and Math Teachers that Report Having Sufficient Materials to Meet Most Students' Needs in 1994, by Cohort, School Poverty, and Students' English Proficiency

	High-Poverty Schools, LEP Students	High-Poverty Schools, EP Students	All Other Schools, LEP and EP Students
1st Grade Cohort (3rd Grade)			
Reading/English/Language Arts Teacher	76.1%	78.9%	86.4%
Math Teacher	77.8	79.0	86.6
3rd Grade Cohort (6th Grade)			
Reading/English/Language Arts Teacher	67.9%	70.2%	86.2%
Math Teacher	77.7	70.0	85.6

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include all students identified as limited English proficient at any time during the survey period.

Exhibit 3.33

Availability of Computer Hardware and Software in Students' Regular Reading/English/Language Arts Class in 1994, by Cohort, School Poverty, and Students' English Proficiency

	High-Poverty Schools, LEP Students	High-Poverty Schools, EP Students	All Other Schools, LEP and EP Students
1st Grade Cohort (3rd Grade)			
Computer Hardware Available	60.9%	59.1%	62.0%
Computer Software Available	59.8%	56.3%	60.9%
Number of Computers Available to Class	*7.3*	*6.6*	*8.0*
3rd Grade Cohort (6th Grade)			
Computer Hardware Available	56.6%	54.6%	56.0%
Computer Software Available	55.4%	50.8%	60.5%
Number of Computers Available to Class	*8.5*	*6.9*	*8.2*

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include all students identified as limited English proficient at any time during the survey period.

Exhibit 3.34

Availability of Computer Hardware and Software in Students' Regular Math Class in 1994, by Cohort, School Poverty, and Students' English Proficiency

	High-Poverty Schools, LEP Students	High-Poverty Schools, EP Students	All Other Schools, LEP and EP Students
1st Grade Cohort (3rd Grade)			
Computer Hardware Available	60.1%	58.9%	62.1%
Computer Software Available	60.0%	55.9%	61.0%
Number of Computers Available to Class	*7.4*	*6.3*	*7.9*
3rd Grade Cohort (6th Grade)			
Computer Hardware Available	58.4%	51.1%	53.1%
Computer Software Available	57.4%	48.7%	60.1%
Number of Computers Available to Class	*8.5*	*6.3*	*6.8*

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include all students identified as limited English proficient at any time during the survey period.

incomplete story, because they say nothing about either the quality of computers in these classrooms, or even more importantly about how the computers are used in instruction. Computers can be used as expensive flash cards for drill purposes or more efficiently for interactive programs in cognitively demanding subjects such as writing, math or science. The way computers are used for instruction is a critical element in assessing whether LEP students are benefitting as much as their EP peers from the availability of computers, but this information is not available in our data.

DO LEP STUDENTS RECEIVE THE SAME INSTRUCTIONAL CONTENT AS EP STUDENTS?

Because of the need to become proficient in English at the same time they are learning subject content, limited English proficient students may receive a watered-down version of the curriculum relative to their EP peers. This raises the risk that, in terms of content, LEP students may progress through school at a slower pace than their EP peers. To address this issue, we compare the instructional content of LEP students' classes to those of EP students in this final section of the Chapter.

Do the regular reading/English/language arts teachers of LEP students emphasize the same skills as teachers of EP students? Factor analysis was undertaken to help bundle the multitude of skills a reading/English/language arts teacher might emphasize into a more manageable, and meaningful, grouping of primary skills emphasized in instruction. (See Appendix E for a description of factor analysis methods and results.) This analysis, using teachers responses on the degree to which they emphasize 25 different skills, was done separately for teachers of 1st grade cohort students (in 3rd grade) and 3rd grade cohort students (in 6th grade) to reflect differences in developmentally appropriate skills at each grade level.

Our analysis indicates that the instructional emphasis of the regular reading/English/language arts teachers can be broken down into five factors. Composite scores were formed for each of these factors by averaging the teacher's response to the amount of emphasis he or she gives to the skills associated with each factor. These composite scores indicate how much emphasis is placed on certain reading and writing skills taught by teachers in their classrooms. The *Remedial-Typical* composite score measures the emphasis on basic reading skills, such as reading readiness, word analysis, and vocabulary, as well as listening skills and following directions. The *Application* composite is an indicator of the level of emphasis on functional applications, such as learning note-taking skills, study skills, or life skills. The *Writing Attitudes-Skills* score measures emphasis placed on basic writing skills, grammar, and spelling in addition to developing students' confidence and appreciation for writing. The *Communication-Integration* score indicates the emphasis on communication skills such as oral communication, reading aloud, and creative projects such as plays or skits. This factor also indicates an emphasis on integrating reading and writing projects, such as having students write about literature and integrating reading into other areas of the curriculum. Finally, the *Reading Comprehension* factor indicates a teacher's emphasis on students' comprehension of facts and details from their reading, as well as their ability to draw inferences and separate fact from opinion.

Exhibits 3.35 to 3.39 compare these five factors between LEP and EP students in high-poverty schools. They show that, in general, the instructional emphases of regular reading/English/language arts classroom teachers of LEP and EP students are very similar. For 3rd grade students in high-poverty schools, the only substantial differences are that teachers of LEP students are more likely to place moderate rather than major emphasis on skills embodied in the Remedial-Typical and Reading Comprehension factors. The Remedial-Typical factor is composed of basic skills needed for reading and writing in the English language, while the Reading Comprehension factor is composed of advanced skills in understanding written materials. The lesser emphasis that LEP students' teachers put on these skills in the 3rd grade relative to EP students' teachers may be an indication that LEP teachers do not think their students are ready for these normally grade-level appropriate skills. The related finding that 6th grade LEP teachers are slightly *more* likely than EP students' teachers to emphasize these skills supports the interpretation that LEP students trail their EP peers in their readiness to be taught these skills in 3rd grade.

Teachers of LEP and EP students in the 6th grade also emphasize similar skills in their instruction. The main differences are that LEP students' teachers are more likely to put major emphasis on the skills embodied in the Writing-Attitude factor and the Communication-Integration skills factor than EP students' teachers. Both of these factors contain writing proficiency skills. Hence their emphasis by LEP students' teachers in the 6th grade may indicate

Exhibit 3.35

Emphasis on Remedial-Typical Skills by LEP Students' Regular Reading/English/Language Arts Teachers in Spring 1994, by Cohort, School Poverty, and Students' English Language Proficiency

Emphasis on Remedial-Typical Skills in Spring 1994	High-Poverty Schools, LEP Students	High-Poverty Schools, EP Students	All Other Schools, LEP and EP Students
1st Grade Cohort (Grade 3)			
Little or No Emphasis	0.9%	1.6%	2.4%
Moderate Emphasis	82.3	64.9	71.9
Major Emphasis	16.8	33.5	25.7
3rd Grade Cohort (Grade 6)			
Little or No Emphasis	2.1%	4.7%	9.8%
Moderate Emphasis	73.7	76.0	74.6
Major Emphasis to Class	24.2	19.3	15.6

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include all students identified as limited English proficient at any time during the survey period.

Exhibit 3.36

Emphasis on Applied Skills by LEP Students' Regular Reading/English/Language Arts Teachers in Spring 1994, by Cohort, School Poverty, and Students' English Language Proficiency

Emphasis on Applied Skills in Spring 1994	High-Poverty Schools, LEP Students	High-Poverty Schools, EP Students	All Other Schools, LEP and EP Students
1st Grade Cohort (Grade 3)			
Little or No Emphasis	22.1%	20.2%	21.8%
Moderate Emphasis	60.2	63.5	64.8
Major Emphasis	17.8	16.3	13.5
3rd Grade Cohort (Grade 6)			
Little or No Emphasis	10.3%	15.9%	18.0%
Moderate Emphasis	66.3	58.3	59.0
Major Emphasis to Class	23.5	25.8	23.0

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include all students identified as limited English proficient at any time during the survey period.

Exhibit 3.37

Emphasis on Writing Attitudes/Skills by LEP Students' Regular Reading/English/Language Arts Teachers in Spring 1994, by Cohort, School Poverty, and Students' English Language Proficiency

Emphasis on Writing Attitudes/Skills in Spring 1994	High-Poverty Schools, LEP Students	High-Poverty Schools, EP Students	All Other Schools, LEP and EP Students
1st Grade Cohort (Grade 3)			
Little or No Emphasis	6.5%	7.2%	6.3%
Moderate Emphasis	42.8	48.4	46.7
Major Emphasis	50.7	44.4	47.0
3rd Grade Cohort (Grade 6)			
Little or No Emphasis	5.5%	13.5%	11.1%
Moderate Emphasis	43.9	47.9	43.7
Major Emphasis to Class	50.6	38.7	45.0

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include all students identified as limited English proficient at any time during the survey period.

Exhibit 3.38

Emphasis on Communication-Integration Skills by LEP Students' Regular Reading or English/Language Arts Teachers in Spring 1994, by Cohort, School Poverty, and Students' English Language Proficiency

Emphasis on Communication-Integration Skills in Spring 1994	High-Poverty Schools, LEP Students	High-Poverty Schools, EP Students	All Other Schools, LEP and EP Students
1st Grade Cohort (Grade 3)			
Little or No Emphasis	1.4%	6.8%	5.2%
Moderate Emphasis	59.0	60.3	59.5
Major Emphasis	39.7	32.9	35.4
3rd Grade Cohort (Grade 6)			
Little or No Emphasis	3.9%	7.0%	9.4%
Moderate Emphasis	57.7	66.5	60.3
Major Emphasis to Class	38.4	26.6	30.3

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include all students identified as limited English proficient at any time during the survey period.

Exhibit 3.39

Emphasis on Reading Comprehension by LEP Students' Regular Reading or English/Language Arts Teachers in Spring 1994, by Cohort, School Poverty, and Students' English Language Proficiency

Emphasis on Reading Comprehension in Spring 1994	High-Poverty Schools, LEP Students	High-Poverty Schools, EP Students	All Other Schools, LEP and EP Students
1st Grade Cohort (Grade 3)			
Little or No Emphasis	5.7%	2.6%	1.6%
Moderate Emphasis	48.7	41.8	46.6
Major Emphasis	45.6	55.6	51.9
3rd Grade Cohort (Grade 6)			
Little or No Emphasis	0.8%	3.1%	3.8%
Moderate Emphasis	40.0	41.3	52.9
Major Emphasis to Class	59.2	55.7	43.4

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include all students identified as limited English proficient at any time during the survey period.

that LEP students trail their EP peers in written communication skills at this point, the most difficult communication skill in elementary school.

Do regular math teachers of LEP students emphasize the same skills as teachers of EP students? Using the same procedures described above for instructional emphasis in reading/English/language arts, composite scores were created to summarize the primary skills emphasized in regular math classes in the spring of 1994. Factor analysis shows the instructional emphasis of math teachers can be broken down into four primary factors.[39] (See Appendix E for details on the results of the factor analysis.) These composite scores indicate how much emphasis is put on certain math skills taught by teachers in their classrooms. The *Math Attitudes* score indicates a teacher's emphasis on students developing an appreciation and confidence in their abilities to do math and to make math enjoyable and applicable to life. The *Remedial-Typical* score is an indicator of the focus on basic math skills, such as an emphasis on learning basic facts and concepts, whole numbers, fractions, and measurement. The *Advanced Math* score measures the exposure provided to more advanced math instruction such as geometry, algebra, trigonometry, or statistics. *Higher-Order Thinking* includes an emphasis on reasoning, analytic skills and problem solving.

Exhibits 3.40 to 3.43 compare these composite scores between LEP and EP students in high-poverty schools. They show that, in general, the teachers of EP and LEP students emphasize similar skills in both the 3rd and 6th grades. Some differences do arise, however. EP students' math teachers in 3rd and 6th grade report major emphasis on Remedial-Typical skills more often than LEP students' teachers. In the 3rd grade, this difference in major emphasis is reflected in a higher proportion of LEP students' teachers reporting moderate emphasis and little or no emphasis relative to EP students' teachers. In contrast, LEP students' teachers in the 6th grade are *less* likely to report little or no emphasis than EP students' teachers, but much more likely to report moderate emphasis.

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[39] For 3rd graders in 1994, the model did not fit well for the fourth factor, math attitudes; hence, only three factors are included for 3rd graders in this report.

Exhibit 3.40

Emphasis on Math Attitudes by Students' Regular Math Teachers in Spring 1994, by School Poverty and Students' English Language Proficiency Status, 6th Grade

Emphasis on Math Attitudes in Spring 1994	High-Poverty Schools, LEP Students	High-Poverty Schools, EP Students	All Other Schools, LEP and EP Students
3rd Grade Cohort (6th Grade)			
Little or No Emphasis	2.2%	2.2%	4.1%
Moderate Emphasis	63.6	65.6	69.5
Major Emphasis	34.2	32.2	26.4

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include all students identified as limited English proficient at any time during the survey period.

Exhibit 3.41

Emphasis on Remedial-Typical Skills by LEP Students' Regular Math Teachers in Spring 1994, by Cohort, School Poverty, and Students' English Language Proficiency

Emphasis on Remedial-Typical Skills in Spring 1994	High-Poverty Schools, LEP Students	High-Poverty Schools, EP Students	All Other Schools, LEP and EP Students
1st Grade Cohort (Grade 3)			
Little or No Emphasis	9.0%	3.7%	4.2%
Moderate Emphasis	67.3	54.4	55.3
Major Emphasis	23.7	41.9	40.5
3rd Grade Cohort (Grade 6)			
Little or No Emphasis	3.7%	9.1%	4.6%
Moderate Emphasis	74.7	60.2	68.4
Major Emphasis to Class	21.6	30.8	27.0

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include all students identified as limited English proficient at any time during the survey period.

Exhibit 3.42

Emphasis on Advanced Math by LEP Students' Regular Math Teachers in Spring 1994, by Cohort, School Poverty, and Students' English Language Proficiency

Emphasis on Advanced Math Skills in Spring 1994	High-Poverty Schools, LEP Students	High-Poverty Schools, EP Students	All Other Students
1st Grade Cohort (Grade 3)			
Little or No Emphasis	73.3%	81.9%	81.5%
Moderate Emphasis	24.9	17.6	18.1
Major Emphasis	1.8	0.4	0.4
3rd Grade Cohort (Grade 6)			
Little or No Emphasis	39.5%	35.6%	41.7%
Moderate Emphasis	57.5	59.3	56.8
Major Emphasis to Class	3.0	5.1	1.6

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include all students identified as limited English proficient at any time during the survey period.

Exhibit 3.43

Emphasis on Higher Order Thinking Skills by LEP Students' Regular Math Teachers in Spring 1994, by Cohort, School Poverty, and Students' English Language Proficiency

Emphasis on Higher Order Thinking Skills in Spring 1994	High-Poverty Schools, LEP Students	High-Poverty Schools, EP Students	All Other Students
1st Grade Cohort (Grade 3)			
Little or No Emphasis	0.3%	1.3%	0.6%
Moderate Emphasis	17.1	14.4	15.8
Major Emphasis	82.6	84.4	83.6
3rd Grade Cohort (Grade 6)			
Little or No Emphasis	2.1%	1.0%	1.1%
Moderate Emphasis	27.8	29.1	25.4
Major Emphasis to Class	70.1	69.9	73.5

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include all students identified as limited English proficient at any time during the survey period.

Are the classroom instructional materials used in regular math and reading/English/ language arts classes the same for LM-LEP students as EP students? Teachers were asked to choose the responses (from the four combinations of English/non-English and same/different materials) to best describe how the principal instructional materials used for their LM-LEP students compare with the principal materials used with English proficient students. Possible responses are listed in the row labels of Exhibit 3.44.

Use of the same materials for LEP students and EP students is an indication that LEP students are receiving the same level of academic content as their EP peers while they are developing their English-language skills. Nevertheless, this is not always feasible even when the instructional program is designed to teach the same level of content to LEP and EP students. A LEP student's English language proficiency may not be adequate to learn from the English material or the material may not be available in the student's first language. Even in math, the use of the same English-language materials may not always be feasible: while some mathematical skills are not language dependent (e.g., arithmetic calculations), some are (e.g., word problems). Research (Cantieni and Tremblay, 1979; and Ramirez, Mather, and Chiodo, 1994) on elementary school children found that to adequately comprehend some mathematical problems requires language skills ahead of the reading ability at that grade level. This means that even in math class, the importance of instructional materials that reflect the students' language background may differ depending on the grade level and math level being taught. In sum, it is not always better for LEP students to be using the same materials as their EP peers.

Exhibit 3.44 shows that nearly four-fifths of the regular 3rd grade reading/English/ language arts teachers of LEP students reported using the exact same instructional materials for their LM-LEP students as for EP students. Twenty-one percent of these teachers reported using non-English versions of the same materials, and nearly 17 percent reported using non-English materials that are different from the materials used for EP students. By the 6th grade, LEP students' teachers were less likely to rely on non-English material and more likely to use the same instructional materials for their LM-LEP and EP students. By this point, only 6 percent reported using non-English materials that are different than the materials used by EP students, 10 percentage points less than the LEP students' teachers in 3rd grade. In both grades, about one out of every five teachers reported using English language materials that are specifically designed for non-native English speakers.

Exhibit 3.44

Type of Instructional Materials Used by LEP Students' Regular Reading/English/Language Arts Teachers for LM-LEP Students Compared to Instructional Materials Used for EP Students in Spring 1994, by Cohort

Instructional Materials for LM-LEP Students Compared to Instructional Materials for EP Students	1st Grade Cohort (Grade 3)	3rd Grade Cohort (Grade 6)
The Same Instructional Materials	79.8%	86.9%
Non-English Language Versions of the Same Materials	20.7	9.6
English-Language Materials that are Designed Specifically for Students Whose Principal Language is Other Than English, and That are Different from Those Used by EP Students	21.9	16.2
Non-English Language Materials that are Different from the Materials Used by EP Students	16.7	6.3

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include all students identified as limited English proficient at any time during the survey period. Percentages do not add up to 100, because teachers could report multiple categories.

As can be seen in Exhibit 3.45, the patterns for regular math classes are similar to those for reading/English/language arts classes, except that the trend towards using the exact same materials for LM-LEP and EP students by the 6th grade is even stronger. Ninety-two percent of LEP students' 6th grade teachers report using English versions of the same materials for LM-LEP students and EP students, and only 6 percent report using materials designed for native speakers of a non-English language.

Do LEP students' classroom teachers use computers in the curriculum as frequently as teachers of EP students? In an earlier section of this chapter, we found that LEP students in high-poverty schools had slightly better access to computer resources than EP students in high-poverty schools. As noted earlier, many LEP students are in classes with somewhat larger class size. Information on how these computers are used, and their impact on learning was not collected in this study. Here, we examine how prevalent computer *usage* is in the curriculum, by analyzing teacher-reported use of computers in the classroom. The results are shown in Exhibit 3.46 (reading/English/language arts) and Exhibit 3.47 (math). In high-poverty schools, reported computer use by LEP students' regular teachers is very similar to that of EP students' regular teachers, with a slightly higher percent of LEP students' teachers reporting frequent or everyday use of computers. This difference is strongest in 6th grade reading/English/language arts classes, where 45 percent of LEP students' teachers report using a computer often or every day while only 35 percent of EP students teachers report that frequency of computer usage. Apparently LEP students in high-poverty schools are in a slightly better position than their EP peers regarding both computer access and computer usage.

SUMMARY

In this chapter, we organized our analysis around three overarching questions regarding the responsiveness, quality, and content of educational services received by LEP students in elementary school. Here, we summarize our findings for LEP students in elementary schools on these three issues.

Exhibit 3.45

Type of Instructional Materials Used by LEP Students' Math Teachers for LM-LEP Students Compared to Instructional Materials Used for EP Students in Spring 1994, by Cohort

Instructional Materials for LM-LEP Students Compared to Instructional Materials for EP Students	1st Grade Cohort (3rd Grade)	3rd Grade Cohort (6th Grade)
The Same Instructional Materials	80.1%	92.0%
Non-English Language Versions of the Same Materials	27.3	13.3
English-Language Materials that are Designed Specifically for Students Whose Principal Language is Other Than English, and that are Different from Those Used by EP Students	18.7	6.3
Non-English Language Materials that are Different from the Materials Used by EP Students	8.5	3.9

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include all students identified as limited English proficient at any time during the survey period. Percentages do not add up to 100, because teachers could report multiple categories.

Exhibit 3.46

Frequency of Computer Use in Regular Reading/English/Language Arts Classes in 1994, by Cohort, School Poverty, and Students' English Language Proficiency

Frequency of Computer Use	High-Poverty Schools, LEP Students	High-Poverty Schools, EP Students	All Other Students
1st Grade Cohort (Grade 3)			
Never	12.6%	18.5%	17.5%
Occasional	16.8	13.5	18.8
Often	50.6	47.6	48.4
Every Day	20.0	20.4	15.3
3rd Grade Cohort (Grade 6)			
Never	38.9%	47.9%	35.3%
Occasional	15.9	17.4	26.0
Often	27.7	24.4	26.3
Every Day	17.5	10.3	12.5

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include all students identified as limited English proficient at any time during the survey period.

Exhibit 3.47

Frequency of Computer Use in Regular Math Classes in 1994, by Cohort, School Poverty, and Students' English Language Proficiency

Frequency of Computer Use	High-Poverty Schools, LEP Students	High-Poverty Schools, EP Students	All Other Students
1st Grade Cohort (Grade 3)			
Never	18.2%	19.4%	21.4%
Occasional	15.9	13.1	20.6
Often	48.2	44.8	41.0
Every Day	17.7	22.7	17.1
3rd Grade Cohort (Grade 6)			
Never	49.7%	55.9%	53.3%
Occasional	19.8	20.8	25.4
Often	22.9	16.8	16.0
Every Day	7.6	6.6	5.3

Notes: Grade level listed assumes students progress one grade level each year after the first year their cohort was sampled. Students who were retained or accelerated are included in the estimates, but may not be in the grade level indicated. In this exhibit, LEP students include all students identified as limited English proficient at any time during the survey period.

Are educational services responsive to the special needs of LEP Students?

School-level. Several schoolwide measures of support for LEP students show initially encouraging evidence: the availability of ESL/BE instruction within the school, principal's language background, coordination and integration of LEP and EP instruction, and support and respect for the families of LEP students. Sixty to 100 percent of LEP students attend schools with favorable indicators in each of these areas. These figures represent an important beginning for a public school system that seeks to support and nurture all students with limited English proficiency. These indicators do not tell us how many of the LEP students in a particular school benefit from the favorable practices known to exist somewhere in the school.

Classroom teacher. About one-third to one-half of LEP students' regular teachers have a background or training indicating understanding and skills in teaching LEP students, as measured by certification in ESL and/or BE instruction or proficiency in the predominant non-English language of LM-LEP students in their classrooms. While this represents a substantial proportion of LEP students' teachers, it leaves ample room for increasing the qualifications of teachers who have LEP students in their class. Of the LEP students with classroom aides, about four-fifths had an aide proficient in the predominant non-English language of the LM-LEP students in their class.

Instructional services. Between 80 and 90 percent of the students identified as limited English proficient in a particular year participated in an ESL/BE instructional program that year. In addition, about 50 percent of LEP students participated in supplementary instruction in reading/English/language arts, while slightly fewer participated in supplementary math instruction. Chapter 1 funding is the primary source of funding for both supplemental math and reading/English/language arts instruction, and a substantial source of funding for ESL/BE instructional services. These service levels appear encouraging for meeting the needs of LEP students.

Do limited English proficient students receive the same quality of educational inputs as English proficient students?

Teacher Quality Indicators. LEP and EP students from high-poverty schools have regular classroom teachers with similar teaching qualifications, as measured by their educational attainment and acquisition of permanent teaching certificates. However, LEP students' teachers are somewhat less experienced: more have fewer than ten years of experience, and more are in their first year of teaching.

Instructional Setting. One finding that could be detrimental to the educational achievement of LEP students is that they are more likely than EP students to be in large classes, even after controlling for the high-poverty status of the student's school. LEP students are also more likely to be grouped in reading/English/language arts based on ability, which could be either detrimental to their progress (if it results in lower expectations) or more appropriate to meet their English language instruction needs.

Instructional Materials. Based on measures of the availability of instructional materials, LEP and EP students in high-poverty schools appear to have similar physical resources at school, although LEP students do appear to be in classes with slightly better access to computers.

Do LEP students receive the same level of instructional content as EP students?

Instructional Emphasis. In general, the skills emphasized by LEP and EP students' regular reading/English/language arts teachers are similar. To the extent that this accurately describes the curriculum administered to LEP students, this is an encouraging finding that indicates LEP students' limited English language proficiency may not be seriously limiting the skills taught to them. One exception to this generalization is that LEP students in the 3rd grade in 1994 were *more* likely to have teachers that place moderate rather than major emphasis on two composite measures of reading skills. A second exception is that LEP students' 6th grade teachers are *more* likely to place major emphasis on writing proficiency skills than EP students' teachers. This may indicate that, by the 6th grade, LEP students are ready for basic writing instruction and yet more in need of those skills than their EP peers.

The instructional emphasis of LEP and EP students math teachers is also similar within high-poverty schools, with the exception that EP students' math teachers place somewhat more emphasis on basic math skills than do LEP students' teachers.

Instructional Materials. In 1994, four-fifths of 3rd grade LEP students were in regular math and reading classes where teachers used the same English and non-English instructional materials for both EP and LEP students. This rate increased to nine out every 10 6th grade LEP students in that year. This is an encouraging indication that the curriculum is not being diminished for LEP students.

Use of the same instructional materials may not always mean the same access to what is being taught. On the one hand, it is important for LEP students to receive the same level of instruction as native speakers of English. However, some would argue that LEP students need materials specifically geared toward their linguistic skills and needs to effectively understand what is being taught. In some cases, use of the same materials may not lead to the equal opportunity to learn the course content.

Computer Use. Finally, consistent with the patterns of availability of computer resources, LEP students' teachers are slightly more likely to include computer usage as a regular part of their instructional curriculum than teachers of EP students in similarly high-poverty schools. This difference is strongest in 6th grade reading/English/language arts classes.

In sum, on many of the measures examined here, LEP students are reported to have levels of access to educational materials and services at levels roughly equivalent to those of other students in high poverty schools. There are some potentially important differences. For example, more than two out of three sixth grade LEP students are in math classes with 26 or more students, compared to slightly less than one out of two for other students in both poverty and other schools. In addition, this survey data does not provide information on *how effectively* the available resources are used for instruction.

CHAPTER 4

EDUCATIONAL OUTCOMES FOR LEP STUDENTS

This chapter looks at the educational outcomes of LEP students, building on the results presented in the previous chapters. As we have seen in earlier chapters, LEP students face large challenges to educational success beyond the need to build proficiency in English. These include attending schools with high concentrations of high-poverty and limited English proficient students, low levels of parent education, and low family incomes. The main *Prospects* report (Puma et al. 1997) generally finds that:

- School poverty concentration is associated with lower academic performance.
- Academic standards vary between high- and low-poverty schools. For example, when measured against standardized test scores, a grade of "A" in a high-poverty school is equivalent to a grade of about "C" in a low-poverty school.

How did LEP students fare? This chapter examines the school and learning outcomes for LEP students.

The report began with a description of how the nationally-representative sample of LEP students was defined for this study. Next we described LEP students in terms of non-school factors (student and family characteristics) that might influence educational outcomes, and then described school- and classroom-level factors that might also influence educational outcomes. In this chapter, we analyze outcomes descriptively over time, comparing LEP and English Proficient (EP) students and looking at different groups of LEP students. Because of resource constraints, we do not try to link outcomes to the inputs described earlier in the report, or to calculate the impact of school services on student achievement.

In the remainder of this section we provide a brief description of each of the four types of outcomes to be considered, the subsamples of students analyzed, and the methodology that was used. Each of the subsequent sections discusses one of the four student outcomes. The chapter ends with a summary of key findings.

Description of the Outcomes Analyzed

This chapter examines four types of educational outcomes for LEP students: teacher assessments of English language proficiency; standardized student achievement test scores in reading; standardized student achievement test scores in math; and grade retention. These outcomes were chosen because they are among the most important outcomes for LEP students that can be analyzed with the *Prospects* data, and because they are heterogeneous enough to provide a broad picture of how LEP students fare in their elementary years.

Teacher Ratings of Students' English Language Proficiency. We analyzed English language proficiency utilizing teacher judgements of student proficiency in understanding, speaking, reading, and writing English. Teachers rated LEP students on a five-level scale, ranging from no English proficiency to excellent English proficiency. Chapter 2 notes the potential drawbacks of relying on subjective teacher assessments of English proficiency. Despite their subjectivity, we believe these measures provide useful information about how the English proficiency of different groups of LEP students improves over time. Of particular interest are contrasts between students who exit LEP status by the end of the observation period and students who remain LEP throughout the same time period.

Student Achievement Test Scores in Reading. We examined achievement test scale scores for two subscales of the Comprehensive Test of Basic Skills (CTBS-4) tests developed by CTB/McGraw-Hill—reading vocabulary and reading comprehension.[1] The main challenge in analyzing test scores for LEP students is that not all LEP students can be tested in English. Some of the students defined as LEP for this study took the CTBS in English, while other Spanish-speaking LEP students took a Spanish version of the CTBS (called the Spanish Assessment of Basic Education, or SABE). For this analysis, we focus only on students who took the CTBS at least once during the study; we do not use SABE reading scores because of difficulties in accurately linking CTBS and SABE reading scores. We compare mean reading test scores over time for: LEP exiters compared to students who remain LEP; all LEP students compared to all EP students; and low-income LEP students compared to low-income EP students.

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[1] The reading vocabulary subtest measures various skills related to constructing and expressing the meaning of vocabulary words, such as selecting synonyms, identifying the meaning of prefixes and suffixes, and completing sentences with the appropriate vocabulary words. The reading comprehension subtest measures students' skills primarily in extracting information from passages and identifying main ideas.

Student Achievement Test Scores in Math. We also examined two CTBS-4 subscale tests in math—math applications and math computations.[2] Unlike for the reading test scores, our analysis of math test scores includes both the CTBS and SABE scores. For this analysis CTB/McGraw-Hill converted the SABE math scores to their CTBS equivalent. Our assumption underlying this analysis is that the CTBS and SABE math scores are more likely to be comparable than are the CTBS and SABE reading test scores.[3] As with reading scores, we compare: LEP exiters to students who remain LEP; all LEP students to all EP students; and low-income LEP students to low-income EP students.

Grade Retention. There are two sources of information on grade retention in the *Prospects* data set. The first source is the parent questionnaire, on which parents were asked if their child had *ever* been retained in a grade. The second source is obtained directly from the sequence of grade progressions for each of the students over the years they were observed. For example, if a student was in 1st grade in 1991, in 2nd grade in 1992, and 2nd grade again in 1993, then he or she was classified as retained in the 2nd grade for this measure. Both measures of grade retention were analyzed.

Sample Definitions and Methodology

In this chapter we look at outcomes for all LEP students and—in the case of test scores and grade retention—for low-income LEP students. The analogous comparison groups in this chapter are all EP students and low-income EP students. For this purpose, low-income students are defined as those students from low-income families (families with an average annual family income less than 185 percent of the poverty level, adjusted for family size) in low-income schools (schools in which at least one-half of the students are eligible for free or reduced-price meals). Since both family poverty and school poverty can exert important influences on student outcomes, controlling for both factors at once provides a better basis for comparing LEP and EP students. The low-income student subsample so defined includes a majority of LEP students[4]—and the most important LEP students from the standpoint of compensatory education—and allows us to isolate outcome differences based on LEP status independent of economic factors. The chapter also presents outcomes for the entire LEP group. Exhibit F.1 in Appendix F shows the unweighted and weighted sample sizes for the groups examined in this chapter.

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[2] The math applications subtest is multiple choice, and focuses on skills such as problem solving, number theory, measurement, and geometry. The math computations subtest measures arithmetic computation skills involving whole numbers, decimals, fractions, and integers.

[3] The degree to which the math tests in Spanish and English are comparable depends in part on the extent to which the tests are language dependent. The more language dependent are the tests, the more difficult it is to make them comparable. For the most part the math tests administered for *Prospects* were not heavily language dependent. The math computations subtest focuses on arithmetic, and the math applications subtest, at least in the early grades, relies more on graphic representations than words. For a general discussion of the degree to which mathematics teaching is language dependent, see Mather and Chiodo (1994).

An important difference between the analyses presented in this chapter and those discussed in previous chapters of this report is that here we examine outcomes for subgroups of LEP students defined by *patterns of LEP status over time*. Identifying subgroups in this way is useful in illustrating the heterogeneity of outcomes for LEP students, just as it helped to illustrate the composition of the LEP population in Chapter 1. The two key subgroups of interest in this chapter are students who are LEP in every year of the study, and students who begin as LEP but who exit LEP status by the end of the study. The latter group is further subdivided according to the year of exit from LEP status.[5] For the 1st grade cohort, therefore, the key subgroups are (with the unweighted number of students in parentheses):[6]

- LEP111: students who were classified as LEP in 1992, 1993 and 1994 (N=1,087);
- LEP110: students who were classified as LEP in 1992 and 1993 but not in 1994 (N=201); and

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[4] Based on the definition of low-income used in this chapter, low-income LEP students comprise 80 percent of all LEP students in the data set (i.e., on an unweighted basis) and 69 percent of all LEP students in the population (i.e., on a weighted basis) averaged across cohorts.

[5] These subgroups together include the great majority of LEP students, more than 85 percent. Outcomes for other LEP students—those who are not identified as LEP in the first year of the study—are not presented separately but are included in the results for all LEP students and for low-income LEP students.

[6] The numbers in parentheses are the number of *all* LEP students in each group. The number of *low-income* LEP students in each group is smaller.

- LEP100: students who were classified as LEP in 1992, but not in 1993 or 1994 (N=138).

The analogous subgroups for the 3rd grade cohort—which we observe for an additional year—are:

- LEP1111: students who were classified as LEP in 1991, 1992, 1993, and 1994 (N=793);
- LEP1110: students who were classified as LEP in 1991, 1992, 1993, but not in 1994 (N=198);
- LEP1100: students who were classified as LEP in 1991 and 1992, but not in 1993 or 1994 (N=152); and
- LEP1000: students who were classified as LEP in 1991, but not in 1992, 1993, or 1994 (N=129).

The numbers in parentheses show that by far the largest group of LEP students—other than those who *enter* LEP status some time during the study period—are those who are LEP in every year of the study.

STUDENT OUTCOMES: ENGLISH PROFICIENCY

The purpose of analyzing teacher ratings of English language proficiency is to identify trends in proficiency measures over time, to compare students who remain LEP with those who exit, and to see how closely exit from LEP status tracks with teacher ratings of students' language proficiency measures. To accomplish these objectives, average teacher ratings for each of four English language proficiency domains were calculated for each of the subgroups of LEP students listed above in each year that they were classified as LEP.[7] These averages were then plotted across years for each subgroup of LEP students.[8] Exhibit 4.1 shows mean teacher ratings of English proficiency for each year for each of the three groups of LEP students in the 1st grade cohort (LEP111, LEP110, LEP100); Exhibit 4.2 shows the analogous measures for the 3rd grade cohort.

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[7] For most students, there are no measures of English proficiency in years when they were not classified as LEP, because teachers were asked to assess English proficiency only for students they regarded as LEP.

Inspection of the plots reveals two major points. First, the upward slopes for non-exiters and second- and third-year exiters means that students' English proficiency improves over time within any subgroup, as expected. This is true for each of the four proficiency domains. These data also show that LEP students are generally judged to be most proficient (i.e., have *higher* plotted values) in understanding English, followed by speaking, reading, and writing, in that order. This ordering holds for every year observed.

That is, understanding and speaking proficiencies (e.,g. "playground English") develop far more rapidly than proficiency in reading and writing in English., Since decontextualized language skills such as reading and writing proficiency are important for a child's ability to keep up with the curriculum and succeed in school, this may have important implications for student placement and services. This finding is consistent with a growing body of research on the timing and sequence of proficiency development in second language acquisition (e.g. Ramirez 1991, Thomas and Collier 1997, and De Avila 1997). Indeed, research by Ramirez and others finds that even in programs where students leave the school's formal "limited English proficient" designation comparatively quickly, many continue to need sustained instructional support to make a successful transition into classrooms where instruction is completely in English.

Second, also as expected, LEP exiters are judged to be more proficient in English than non-exiters prior to exit. This is true, however, not just in the year preceding exit, but for *every prior year observed.* Further, for the 3rd grade cohort this pattern holds across the different groups of exiters: second-year exiters are judged more proficient than third-year exiters, who in turn are judged more proficient than fourth-year exiters in all common years of observation. The consistency of these patterns supports the internal validity of teacher assessments of English proficiency.

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[8] These calculations were done for the entire LEP sample, and not separately for low-income LEP students.

Exhibit 4.1

Teacher Ratings of Students' English Proficiency, 1st Grade Cohort

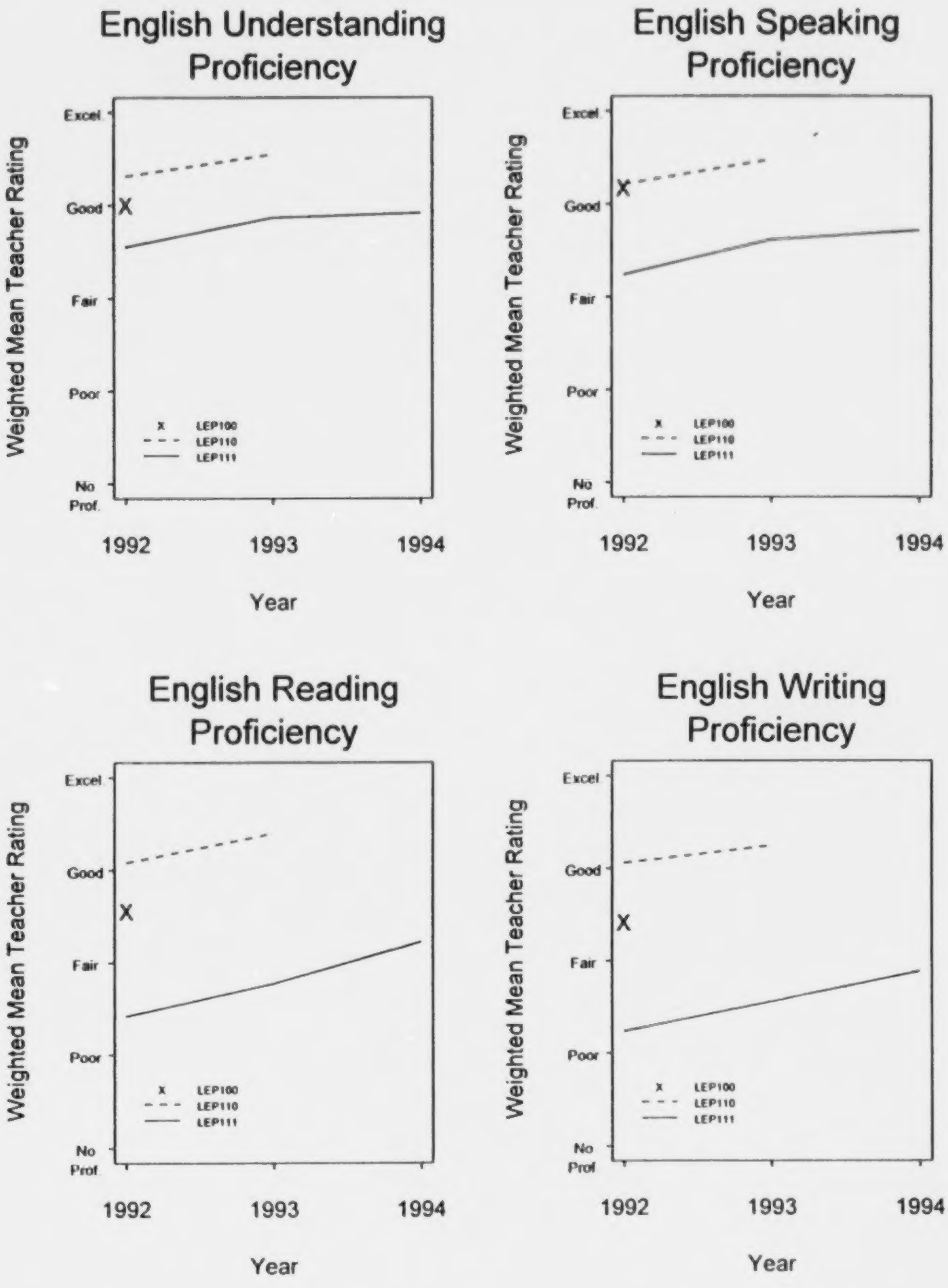
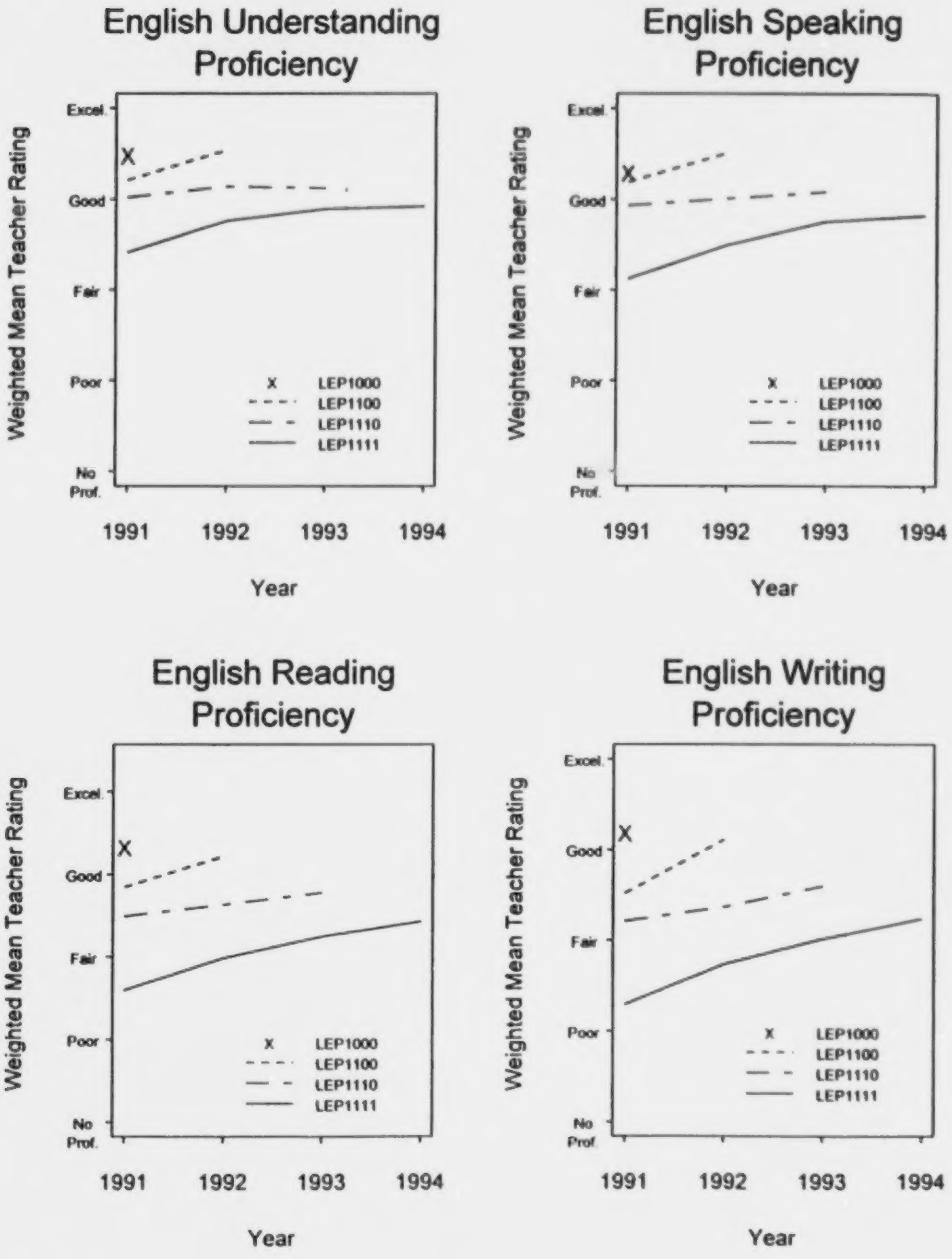


Exhibit 4.2

Teacher Ratings of Students' English Proficiency, 3rd Grade Cohort



Because these results show that LEP exiters start out with considerably higher levels of proficiency than do students who remain LEP, they suggest that exit from LEP status is strongly related to where a student starts in the observation period, and—for the first grade cohort that starts out near school entry—that non-school factors may be important in explaining how long it takes children to leave LEP status.

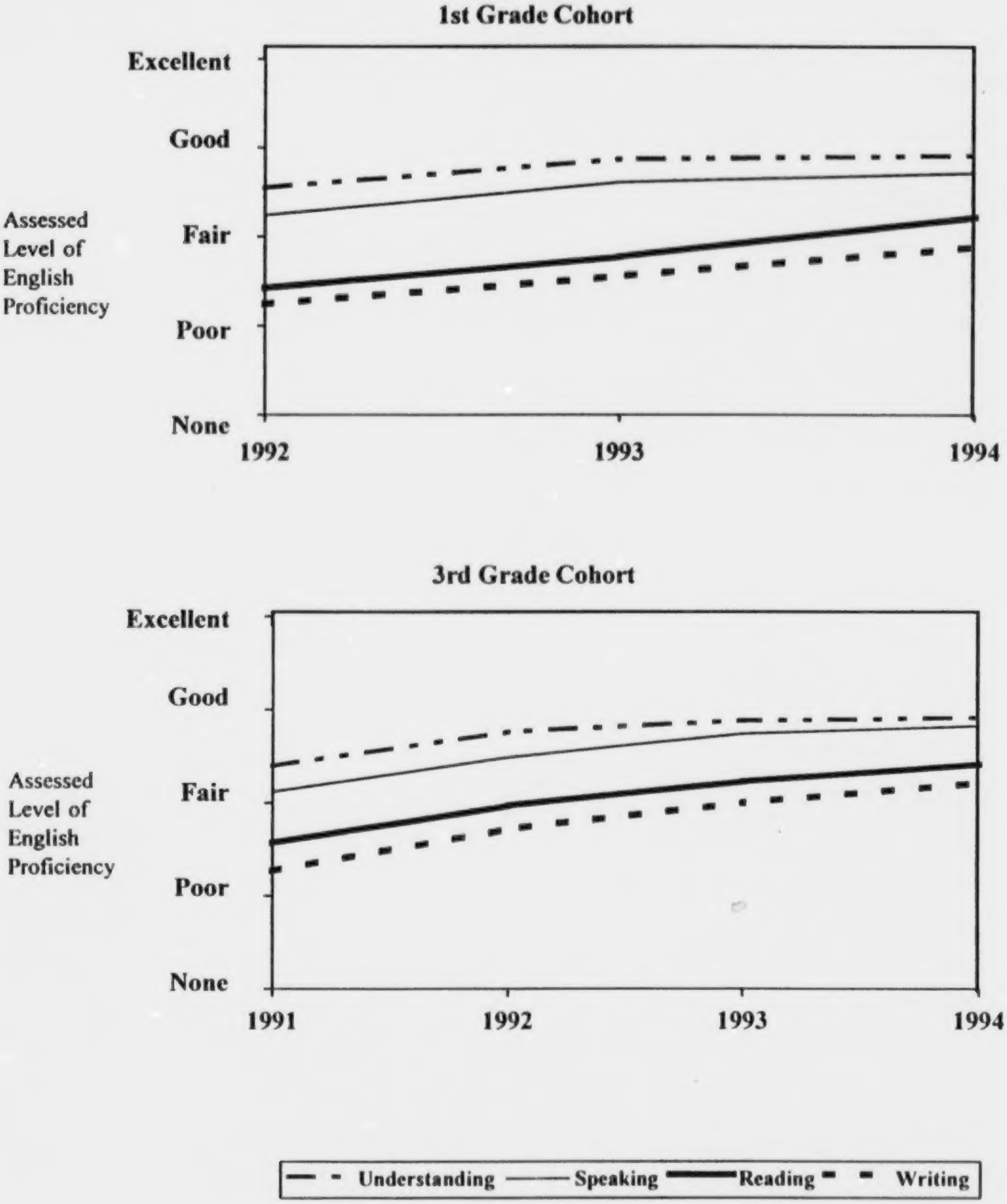
Comparing average teacher ratings across cohorts, we see little difference. That is, the 3rd grade cohort, despite being older, was not judged to have higher first-year levels of English proficiency than the 1st grade cohort. As discussed in Chapter 2, this could be evidence of a compositional difference between the LEP students in the two cohorts. That is, because every year some fraction of LEP students improve their English proficiency enough to exit LEP status, students who are still LEP in the third grade may on average have begun school with more limited English proficiency than other LEP students. A related possibility is that some fraction of LEP students in the 3rd grade cohort may have entered U.S. schools after the first grade. The lack of a large difference between cohorts in first-year English proficiency is also consistent, however, with the hypothesis that teacher ratings are to some extent relative to expectations for the grade level.

The next exhibit focuses on the subgroup of students who are LEP in every year of the study. For this subgroup, we have proficiency measures for every year of the study, which enables us to examine how proficiency develops over time across different domains. Compared to other LEP students, this group has a lower level of English proficiency in the first year of the study (as shown in Exhibits 4.1 and 4.2), which means the patterns for this group are likely not to be representative of the patterns for all LEP students. Nevertheless, students who are LEP for every year of the study are a sizeable fraction of all students identified as LEP (66 and 46 percent of the 1st and 3rd grade cohort LEP students, respectively), and an important group from a policy perspective.

Exhibit 4.3 shows that proficiency in understanding and speaking English precedes proficiency in reading and writing. At the same time, there is some evidence of catch-up; growth in reading and writing proficiency is greater than growth in understanding and speaking ability. For the 3rd grade cohort, growth in proficiency slows over time for all domains. For the 1st grade cohort, growth in proficiency slows for understanding and speaking, but not for reading and

Exhibit 4.3

Growth in Teacher-Assessed English Proficiency by Domain, for Students Who are LEP in All Years



writing; evidently these very young students are still on the steep part of the learning curve for reading and writing. The general pattern of achievement growth rates that slow over time is typical of results from other studies of student achievement. The patterns of acquisition of language proficiency are also consistent with other research; see for example De Avila (1997). Based on the limited information available, it is difficult to determine how long it will take these students to achieve English proficiency on a par with native English speakers, but the trajectories shown suggest that these students on average will reach "good" levels of proficiency in all four domains in approximately six to seven years overall (i.e., three years beyond the last year of observation). This duration is also consistent with other research; for summaries of this research see Collier (1995).

STUDENT OUTCOMES: READING ACHIEVEMENT TEST SCORES

In this section, we analyze standardized achievement test scores in reading. This analysis includes only those LEP students who took the CTBS at least once during the *Prospects* study, so the reading scores reported here represent the achievement of those LEP students who were judged by their teachers to be capable of testing in English. As a result, this subsample of LEP students who took the CTBS test are likely to have higher levels of English proficiency than the LEP sample as a whole. (The analysis of mathematics achievement in the next section includes the full LEP subsample.) We examine growth in mean test scores over time and differences in mean scores across certain groups of students. This analysis shows that students who are LEP in all years of the study score below both EP students and students who exit LEP status. LEP exiters' scores are closer to those of EP students and, for the 1st grade cohort, there is evidence that the gap in scores between these two groups narrows over time.

About 69 percent of LEP students in the 1st grade cohort and 90 percent of LEP students in the 3rd grade cohort took the CTBS at least once during the study.[9] The remaining LEP students—many of whom took the Spanish-language version of the CTBS[10]—were excluded from this analysis of reading test scores, because of concerns about comparability between the CTBS and SABE reading tests.

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[9] About 1.5 percent of students identified as EP in each year did not take the CTBS during the study period, and are therefore also excluded from this analysis. Appendix F shows the percentage of students who took the CTBS or SABE tests.

Two CTBS reading tests were administered, covering vocabulary and comprehension. Questions on the reading vocabulary test ranged from recognizing the name of an item pictured in the early elementary grade tests, to knowing the meaning of a word in the context of a passage in the later elementary grade tests. Questions on the reading comprehension test ranged from circling pictures that answer questions about a short passage read to the student in the earliest elementary school grade tests, to questions that require a student to analyze a passage in the later elementary school grade tests.[11]

Reading Test Scores for All Students

The top panel of Exhibit 4.4 shows the average reading vocabulary scale scores[12] for all 1st grade cohort students who took the CTBS in at least one year of the *Prospects* study. The scores are reported separately for: students who were identified as LEP in all years (grades 1 through 3); LEP exiters (those who were LEP in grades 1 and 2 only, or in grade 1 only); and students who were English proficient in all years. At least 95 percent of LEP exiters and "never LEP" students took the CTBS one or more times. However, only 54 percent of the students identified as LEP in *all* years took the CTBS at least once (see Appendix F, Exhibit F.4). Therefore, results for this latter group (the majority of LEP students) may not be representative.

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[10] If school staff judged that a student's limited English proficiency did not allow him or her to be meaningfully tested in English, and if a student's first language was Spanish, they were administered a Spanish-language test battery, the Spanish Assessment of Basic Education (SABE). If a LEP student's first language was not Spanish and school staff judged that the English-language version of the test would not be meaningful, the student was not tested in that year.

[11] For more information on the types of questions on each test, see CTB's Test Coordinator's Handbook (1990).

[12] Scale scores are the only test scores used in this report. Scale scores are units on a single equal-interval scale that is applied across all levels of the test regardless of grade or time of year of testing. These scores are expressed as numbers that may range from 0 through 999. Hence, these scores can be compared across grade levels and a 10-point difference has the same meaning at every level of the scale. For more information on scale scores, see CTB's Technical Bulletin (1989).

Exhibit 4.4

Reading Comprehension and Vocabulary Subtest Mean Scores for LEP Exiters, LEP Non-Exiters, and EP Students 1st Grade Cohort

	LEP in Grades 1 through 3 (n=583)	LEP in Grades 1 and 2 Only (n=199)	LEP in Grade 1 Only (n=131)	Never LEP (n=7,299)
	Reading Vocabulary, Weighted Average Score			
Grade 1 (Fall 1991)	422	441	451	482
Grade 1 (Spring 1992)	510	547	562	564
Grade 2 (Spring 1993)	574	622	622	631
Grade 3 (Spring 1994)	615	665	666	663
	Reading Comprehension, Weighted Average Score			
Grade 1 (Fall 1991)	417	436	453	479
Grade 1 (Spring 1992)	500	533	556	555
Grade 2 (Spring 1993)	558	610	608	620
Grade 3 (Spring 1994)	607	663	664	665

Note: The grade level listed in the first column assumes that all students in the cohort progress one grade level each year. Thus, students that were retained or accelerated during the *Prospects* study are included in the estimates with the rest of their cohort, even though they may not be in the grade level indicated.

The first column of the exhibit shows that average scores for students identified as LEP in all three grades rise from 422 in the fall of 1st grade to 615 in the spring of 3rd grade. These scores are consistently below those of LEP exiters and EP students. On the other hand, the scores for LEP exiters—which start out 30 to 40 points below those of EP students—are comparable to those of EP students by the end of the study period.[13]

The bottom panel of Exhibit 4.4 shows a very similar story for the average reading *comprehension* test scores for the same groups of 1st grade cohort students. Students identified as LEP in all three years score well below LEP exiters and EP students in every year. But LEP exiters catch up to EP students, and by 3rd grade LEP exiters have the same mean reading comprehension scores as EP students.

Exhibit 4.5 presents the analogous information for the 3rd grade cohort. Nearly all LEP exiters and EP students, and 81 percent of students identified as LEP in all four years, took the CTBS at least once (see Exhibit F.4 in Appendix F).

As was true for the 1st grade cohort, students in the 3rd grade cohort who were identified as LEP in all four years had lower reading scores than LEP exiters and EP students.[14] The size of the gap between "always" LEP students and EP students is similar to the gap for the 1st grade cohort. Unlike for the 1st grade cohort, however, LEP exiters' scores do not catch up to the scores of EP students. This result is consistent with a compositional difference between LEP students in the 1st and 3rd grade cohorts, as discussed in Chapter 2. Finally, earlier LEP exiters—who typically entered the study with higher levels of proficiency in English—have consistently higher scores than later LEP exiters.

Overall, the reading results suggest that, as with the main study findings for Chapter 1, programs as then configured were not fully closing the gap in performance among students.

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[13] Standard deviations are largest for EP students and smallest for students who were LEP in all years. For example, standard deviations for reading vocabulary for EP students in the 1st grade cohort are about 60 points, compared to about 45 points for students who are LEP in all years. Standard deviations are about 15 to 20 points larger for reading comprehension than for reading vocabulary. CTB's Technical Bulletin (1989) also shows that standard deviations of reading test scores decline with grade level.

[14] Standard deviations in reading test scores are smaller for the 3rd grade cohort than for the 1st grade cohort, although the patterns are similar. Standard deviations for reading vocabulary for EP students in the 3rd grade cohort are about 50 points, compared to about 40 points for students who are LEP in all years. For reading comprehension, standard deviations are about 60 points for EP students and 40 points for students who are LEP in all years.

Exhibit 4.5

Reading Comprehension and Vocabulary Subtest Mean Scores for LEP Exiters, LEP Non-Exiters, and EP Students 3rd Grade Cohort

	LEP in Grades 3 through 6 (n=638)	LEP in Grades 3, 4 and 5 Only (n=191)	LEP in Grades 3 and 4 Only (n=148)	LEP in Grade 3 Only (n=129)	Never LEP (n=7,655)
Reading Vocabulary, Weighted Average Score					
Grade 3 (Spring 1991)	615	633	639	639	676
Grade 4 (Spring 1992)	626	651	658	658	692
Grade 5 (Spring 1993)	643	663	673	688	710
Grade 6 (Spring 1994)	661	686	697	695	727
Reading Comprehension, Weighted Average Score					
Grade 3 (Spring 1991)	609	628	640	650	682
Grade 4 (Spring 1992)	640	663	672	678	703
Grade 5 (Spring 1993)	648	665	680	680	707
Grade 6 (Spring 1994)	671	690	701	694	722

Note: The grade level listed in the first column assumes that all students in the cohort progress one grade level each year. Thus, students that were retained or accelerated during the *Prospects* study are included in the estimates with the rest of their cohort, even though they may not be in the grade level indicated.

Students who were identified as LEP by the study during each year of the study started with lower reading scores. While they made important gains, they continued to have lower scores than their EP schoolmates during every year of the study. On the other hand, students who exited LEP status quickly tended to start with higher levels of English proficiency than students who did not change LEP status. By the end of the study these exiters did not perform very differently from their EP counterparts.

The persistence of initial differences in outcomes for most LEP students is consistent with other results in this report and suggests that, at least during the three to four year period covered by this study, where a student starts has an important influence on where he or she ends up.

Reading Test Scores for Low-Income Students

We also examined CTBS reading test scores for *low-income* LEP and EP students. As explained earlier in this chapter, low-income students are defined as those in families with an average annual income less than 185 percent of the poverty level *and* who attend low-income schools (i.e., schools in which at least one-half of the students are eligible for free or reduced-price meals). Restricting the analysis to low-income students allows us to control partly for the greater level of economic disadvantage faced by LEP students relative to EP students.

Exhibit 4.6 shows that, as with the results above, students who are LEP in all years consistently score below EP students and LEP exiters. There appears to be some catch up during the first grade year: the gap is larger in the beginning of grade 1 than at the end of grade 1, although the gap is stable thereafter. On the other hand, there is no evidence of a gap between LEP exiters and EP students. After controlling for low-income status, LEP exiters in the 1st grade cohort generally have the same, or slightly higher, reading test scores as their EP counterparts in every year. This suggests that differences in economic status are part of the reason for the differences in test scores between LEP exiters and EP students seen in the previous section.[15]

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[15] Standard deviations in reading test scores are about 5 points smaller for low-income students compared to all students. The patterns are similar to those for all students: standard deviations are smaller for "always" LEP students than for EP students, and are smaller for reading vocabulary than for reading comprehension.

Exhibit 4.6

Reading Comprehension and Vocabulary Subtest Mean Scores for LEP Exiters, LEP Non-Exiters, and EP Students Low Income Students, 1st Grade Cohort

	LEP in Grades 1 through 3 (n= 433)	LEP in Grades 1 and 2 Only (n=143)	LEP in Grade 1 Only (n=80)	Never LEP (n=2,930)
		Reading Vocabulary, Weighted Average Score		
Grade 1 (Fall 1991)	419	455	479	455
Grade 1 (Spring 1992)	507	547	546	530
Grade 2 (Spring 1993)	570	607	612	593
Grade 3 (Spring 1994)	612	644	644	631
		Reading Comprehension, Weighted Average Score		
Grade 1 (Fall 1991)	418	434	462	451
Grade 1 (Spring 1992)	500	534	542	516
Grade 2 (Spring 1993)	556	592	596	570
Grade 3 (Spring 1994)	600	643	643	624

Note: The grade level listed in the first column assumes that all students in the cohort progress one grade level each year. Thus, students that were retained or accelerated during the *Prospects* study are included in the estimates with the rest of their cohort, even though they may not be in the grade level indicated.

The results for low-income students in the 3rd grade cohort, shown in Exhibit 4.7, are generally similar. Again, scores for students who are LEP in all years are lower than those for LEP exiters and EP students. The initial test scores for LEP exiters are below those of EP students, but LEP exiters catch up or come very close by the end of the observation period. As with the 1st grade cohort, these results, compared with the results of the previous section, suggest that LEP students' greater economic disadvantage is partly responsible for their test scores being lower than those of EP students.

STUDENT OUTCOMES: MATH ACHIEVEMENT TEST SCORES

In addition to CTBS reading scores, we analyzed CTBS scale scores for math applications (SSMA) and math computation (SSMC). There are two key differences between the math and reading test analyses. First, the math test analysis includes students who took the SABE; their scores were converted to CTBS equivalents.[16] This was not done for reading scores because of concerns about comparability between the CTBS and SABE. Second, and in part because of the lesser concern about comparability, we used hierarchical linear models (HLM) for the math score analysis, a more rigorous approach than computing mean test scores.

Hierarchical linear modeling is a form of regression analysis that is appropriate when, as in the *Prospects* context, the outcomes of interest occur within a multilevel structure. For example, the *Prospects* study collected test scores at multiple time points for the same student, for multiple students in the same classroom, and for multiple classrooms in the same school. Hierarchical models take into account this natural nesting process to provide a more detailed picture of how test scores differ. Unlike simpler approaches, hierarchical models can estimate the extent to which test score differences are related to person-level characteristics as opposed to classroom-level or school-level factors. For a detailed discussion of how hierarchical linear models can be used to analyze test scores for the *Prospects* sample, see Puma et al. (1996).

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[16] Exhibits F.2 and F.3 in Appendix F provide detail on the number of LEP and EP students who took the CTBS and SABE tests, and the number of times students took these tests. In brief, nearly every LEP student in our sample (98 percent) took the CTBS or SABE at least once during the study period, and most students took the tests on multiple occasions.

Exhibit 4.7

Reading Comprehension and Vocabulary Subtest Mean Scores for LEP Exiters, LEP Non-Exiters, and EP Students Low Income Students, 3rd Grade Cohort

	LEP in Grades 3 through 6 (n=215)	LEP in Grades 3, 4 and 5 Only (n=84)	LEP in Grades 3 and 4 Only (n=87)	LEP in Grade 3 Only (n=74)	Never LEP (n=2,342)
	Reading Vocabulary, Weighted Average Score				
Grade 3 (Spring 1991)	615	635	631	641	651
Grade 4 (Spring 1992)	626	648	652	657	664
Grade 5 (Spring 1993)	640	660	664	692	681
Grade 6 (Spring 1994)	663	681	687	693	697
	Reading Comprehension, Weighted Average Score				
Grade 3 (Spring 1991)	611	629	637	660	651
Grade 4 (Spring 1992)	641	661	663	683	675
Grade 5 (Spring 1993)	645	664	670	684	675
Grade 6 (Spring 1994)	671	691	692	692	696

Note: The grade level listed in the first column assumes that all students in the cohort progress one grade level each year. Thus, students that were retained or accelerated during the *Prospects* study are included in the estimates with the rest of their cohort, even though they may not be in the grade level indicated.

The approach used in this report differs from the approach in the main *Prospects* report in that here we do not include multiple explanatory variables in the models; instead, test scores are modeled solely as a function of increasing grade level (which, for non-retained students, is equivalent to modeling test scores as a function of time). So the model employed here shows how math test scores increase with each grade level, and how initial test scores differ across subgroups of LEP students and EP students. The advantage of a hierarchical model in this context, compared to simply calculating mean test scores at each grade level, is that the model allows us to determine when differences in test scores between groups of students (e.g., LEP exiters versus nonexiters) are meaningful (i.e., statistically significant). See Appendix G for a description of the structure of the model used in this chapter.

Separate models were fit for each math scale score in each cohort and for two contrasting samples: all LEP students compared to all EP students, and low-income LEP students compared to low-income EP students. Estimates for LEP students were derived separately for non-exiters and for the several types of exiters.

We began this analysis by estimating exploratory models to identify the appropriate functional form for growth in test scores. On average, CTBS scale score gains were greater from 1st to 2nd grade than from 2nd to 3rd grade.[17] Estimating a model with a linear function of grade is appealing because of its simplicity and familiarity to most readers. Therefore, we used an appropriate linearizing transformation for the 1st grade cohort data to take into account the steeper slope from 1st to 2nd grade than from 2nd to 3rd grade.[18]

The discussion that follows focuses first on the math applications and computations results for all LEP students compared to all EP students, and then discusses the results for the analogous low-income groups.

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[17] No such differences were found in the data for the 3rd grade cohort.

[18] This means that the cohort parameter estimates shown in Appendix H are for transformed data. To see, for example, how many points LEP111 students were below EP students in the first grade, one needs to transform the predictions back to the original scale. Further details on this transformation can be found in Puma et al. (1996).

Math Applications Test Scores

Exhibit 4.8 shows average math applications scale scores in 1st, 2nd, and 3rd grades for all EP students and the three most common groups of LEP students in the 1st grade cohort (LEP111, LEP110, LEP100). The lines in the graph are "fitted" growth curves; i.e., each line shows the average scale score estimated by the HLM analysis for a particular group of students in each grade. For example, the lowest, lighter, solid line in the exhibit shows that students who are LEP in every year have lower average math applications test scores in every year than any of the other groups of students.

The legend inside the graph shows—in the column titled "Intercept"—whether the 1st grade test scores for each group of LEP students is statistically different from the 1st grade test scores of EP students,[19] represented by the heavy, solid line. Analogously, the column titled "Slope" indicates whether the *growth* in test scores for each group of LEP students is statistically different from the growth in test scores of EP students. Parameter estimates for this model, and for all the test score models discussed in this section, are shown in Appendix H.

The results indicate that students who were LEP in all three years (LEP111) had significantly lower *initial* test scores than EP students and LEP exiters. LEP111 students scored an average of 44 points (or approximately two-thirds of a standard deviation) below EP students.[20] At the same time, the LEP111 students did not have significantly different growth rates (slopes) than EP students. This means that the LEP111 students began with significantly lower math applications scores in 1st compared to all EP students, and showed no evidence of catching-up or falling further behind: the difference in scores persisted through 3rd grade. As with the results reported for English proficient students in the main *Prospects* report, keeping up is not enough. Closing the gap between LEP students and EP students requires that LEP students progress faster than EP students (e.g. Thomas and Collier 1997).

Inspection of the curves also shows that second-year LEP exiters (LEP100) scored higher, on average, than third-year LEP exiters (LEP110), who scored, on average, higher than students

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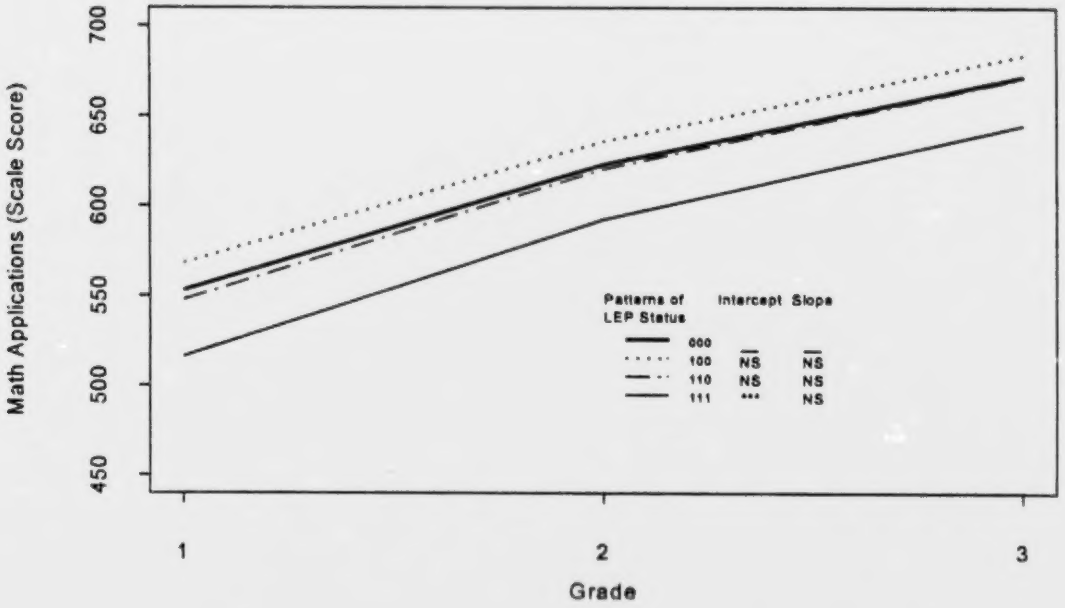
[19] "NS" means not significant; significance at the 10, 5, and 1 percent levels are indicated by *, **, and ***, respectively.

[20] The standard deviation for the 1st grade Spring math concepts and applications test was 70 points, as reported in the CTBS Technical Report, Fourth Edition, page 301.

Exhibit 4.8

Math Applications Subtest
HLM Predicted Scores for LEP Exiters, LEP Non-Exiters, and EP Students
1st Grade Cohort



who were LEP in all three years (LEP111), a pattern repeated below in other exhibits. Although second-year LEP exiters (LEP100) had estimated average scores that were higher than those of EP students, there were no statistically significant differences in the estimated intercepts and slopes of this group of LEP exiters relative to those of all EP students. Nevertheless, this is the same pattern of results (LEP non-exiters having lower outcomes in every year than LEP exiters) as for teacher assessments of English proficiency, presented earlier in the chapter.

Exhibit 4.9 presents the analogous information for math applications test scores for the *3rd grade cohort*. The pattern of results here is generally similar to that for the 1st grade cohort: *at each time point* LEP non-exiters scored significantly below EP students, and below LEP exiters. Unlike the 1st grade cohort, all of the groups of LEP students shown on the 3rd grade cohort plot had significantly lower initial test scores than EP students.

There is, however, some evidence of catch-up for students in this cohort: the growth rate in test scores for LEP non-exiters, and for third- and fourth-year exiters, was significantly higher than that of EP students, although the point estimates are fairly small (about 5 scale score points gained per year). LEP students were still scoring below EP students in the 6th grade, on average, but the gap was not as great as it had been in 3rd grade.

As with English proficiency ratings in the 3rd grade cohort, those who left LEP status sooner scored better. Taken together, the math applications results are somewhat more encouraging for the 3rd grade cohort than for the 1st grade cohort.

Math Computation Test Scores

Exhibit 4.10 shows the estimated growth curves and parameter estimates for the math *computation* scores of the 1st grade cohort, again comparing all LEP students to all EP students. (Results for *low-income* students are reported in the next section.) Although the pattern of growth curves looks similar to the pattern for the math applications test score analysis, presented above, there are some differences in statistical significance. The test scores of LEP nonexiters do not differ significantly—either in initial level or growth rate—from the scores of all EP students. On the other hand, second year-exiters (LEP100) and third year-exiters (LEP110) had significantly *higher* initial test scores (intercept levels) than EP students. Among the subgroups of LEP students, early exiters scored higher than later exiters, who scored higher than non-exiters,

Exhibit 4.9

Math Applications Subtest
HLM Predicted Scores for LEP Exiters, LEP Non-Exiters, and EP Students
3rd Grade Cohort

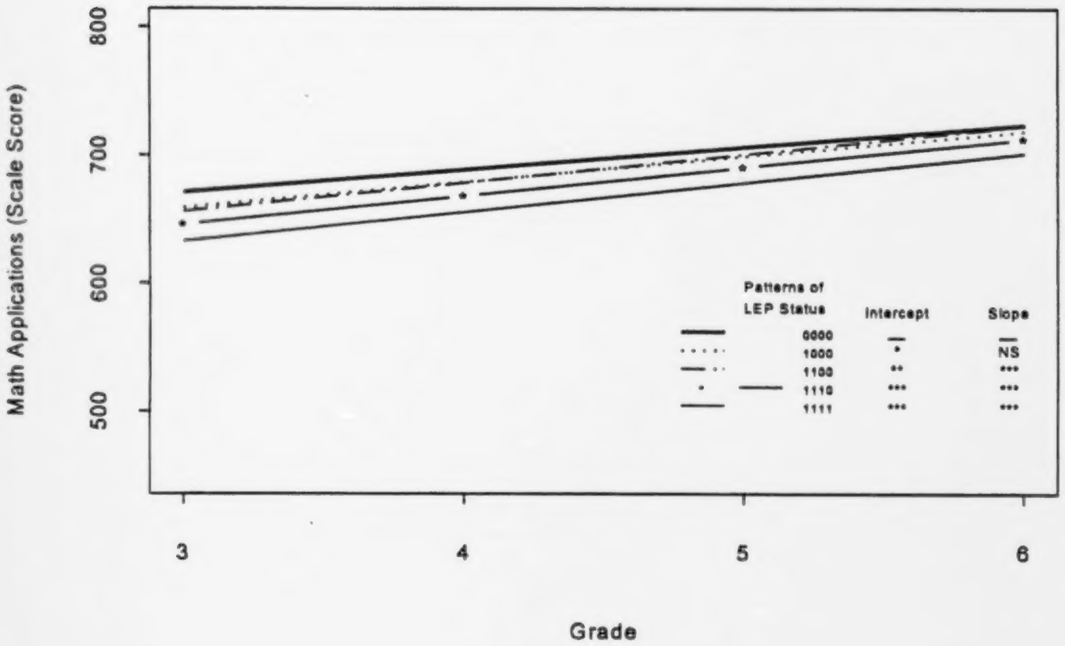
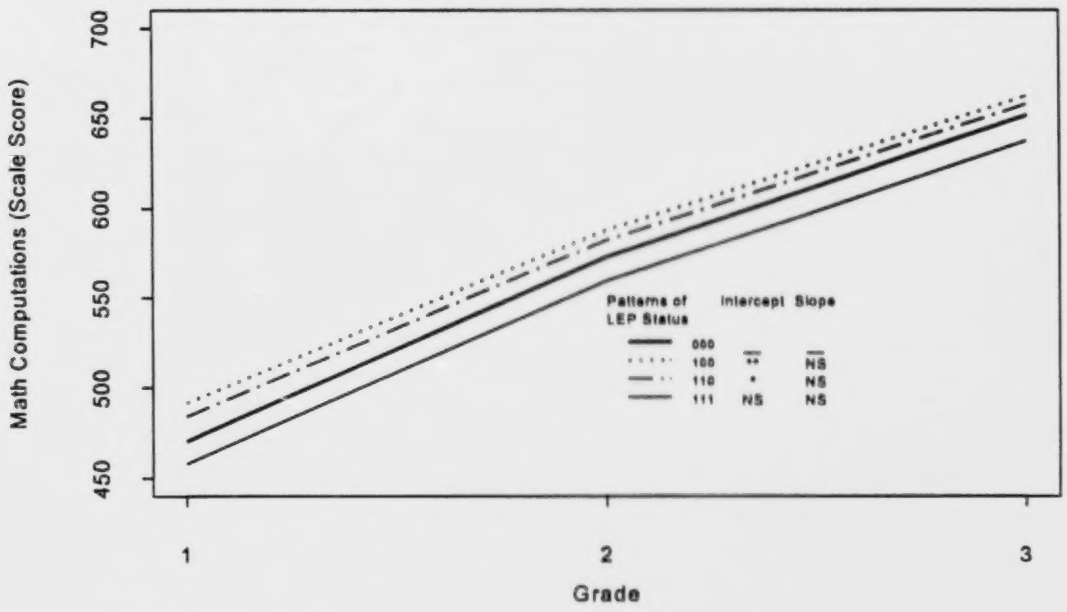


Exhibit 4.10

Math Computations Subtest
HLM Predicted Scores for LEP Exiters, LEP Non-Exiters, and EP Students
1st Grade Cohort



consistent with results presented above (though statistical tests were not run comparing these groups). These results suggest substantial heterogeneity in the achievement of LEP students.

Exhibit 4.11 shows that there were fewer significant differences between all LEP and all EP students for the math computations measure than for the math applications measure in the 3rd grade cohort. Non-exiters and fourth-year exiters had significantly lower intercept levels, but significantly higher growth rates (slopes) than EP students. Thus, in 3rd grade, these two kinds of LEP students, on average, scored lower than EP students, but by 6th grade their scores were, on average, equal to or at least closer to those of EP students. Math computations scores for the other LEP groups (second- and third-year exiters) were not significantly different—in level or growth—from those of EP students.

Overall, the average test score advantage of EP students over LEP students appears to be smaller for math computations than for math applications. Even more encouraging is the evidence that the gap is changing over time for LEP students in the higher grade levels. The difference in results between the two test components might be explained by the different nature of the two subtests, to the extent that English language limitations pose less of a problem for the computations test than for the applications test (for LEP students taking the English version of the tests), or might reflect real differences in how LEP status relates to underlying competencies.

Math Test Scores for Low-Income Students

Parallelling Exhibit 4.8 for all students, Exhibit 4.12 shows the predicted math applications growth curves for low-income LEP students compared to low-income EP students in the 1st grade cohort. Exhibit 4.13 presents the analogous information for math applications scores in the 3rd grade cohort. In general, low-income LEP students compare more favorably to low-income EP students than all LEP students compare to all EP students (see Exhibits 4.8 and 4.9 above). For the 1st grade cohort, second-year exiters had significantly higher initial test scores than low-income EP students, while LEP non-exiters had significantly lower initial test scores but higher growth rates than EP students. For the 3rd grade cohort, low-income third- and fourth-year exiters had significantly higher growth rates than low-income EP students, though at least the latter started out behind in 3rd grade. Again, LEP non-exiters had lower initial test scores but higher growth rates than EP students.

Exhibit 4.11

Math Computations Subtest
HLM Predicted Scores for LEP Exiters, LEP Non-Exiters, and EP Students
3rd Grade Cohort

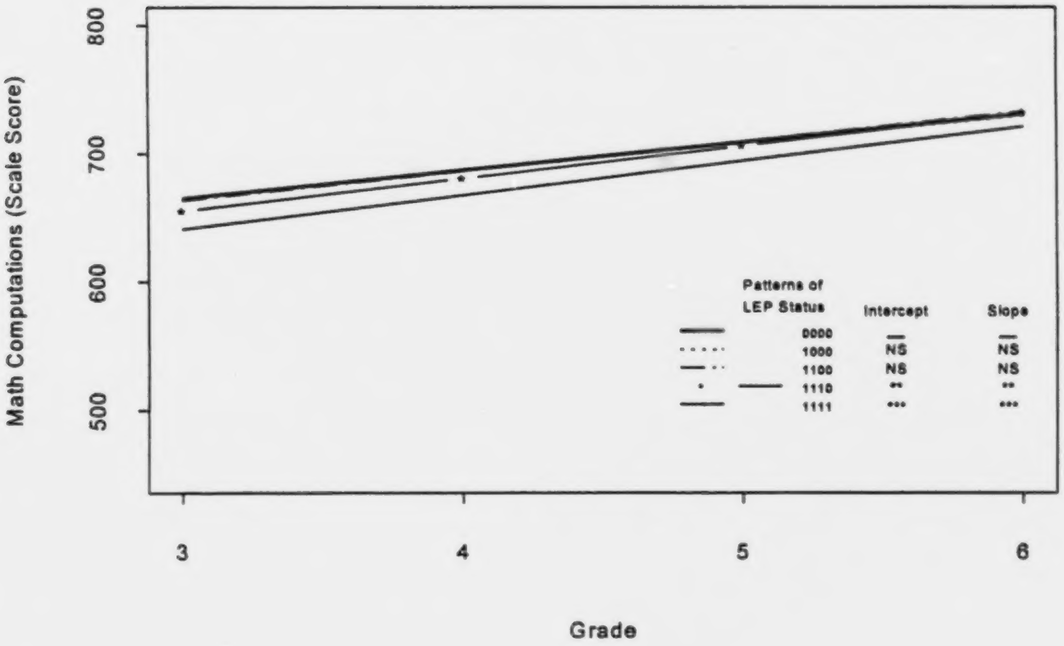


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Exhibit 4.12

Math Applications Subtest
HLM Predicted Scores for LEP Exiters, LEP Non-Exiters, and EP Students
Low Income Students
1st Grade Cohort

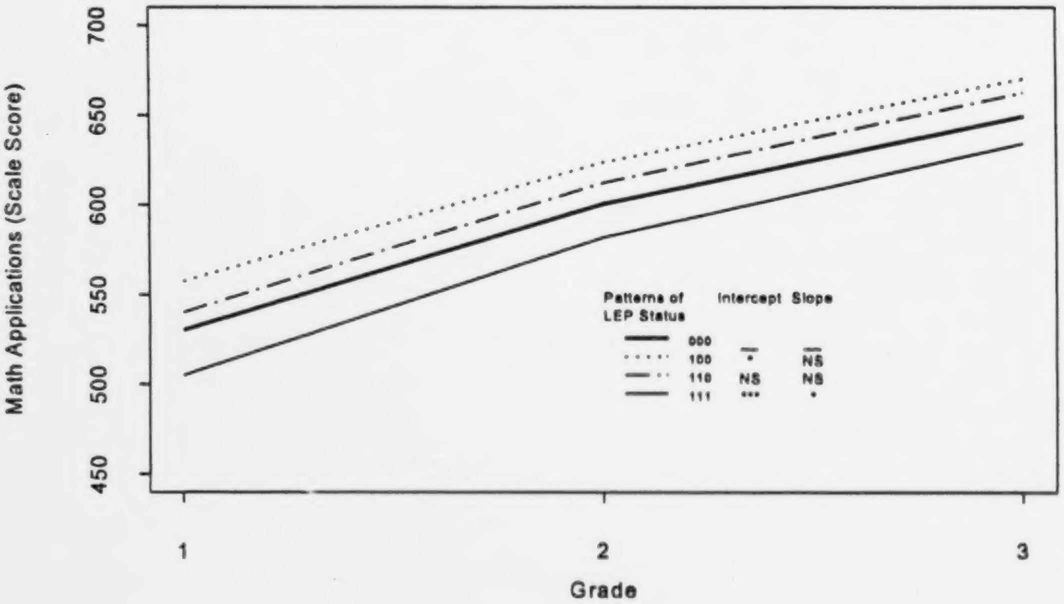

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Exhibit 4.13

Math Applications Subtest
HLM Predicted Scores for LEP Exiters, LEP Non-Exiters, and EP Students
Low Income Students
3rd Grade Cohort

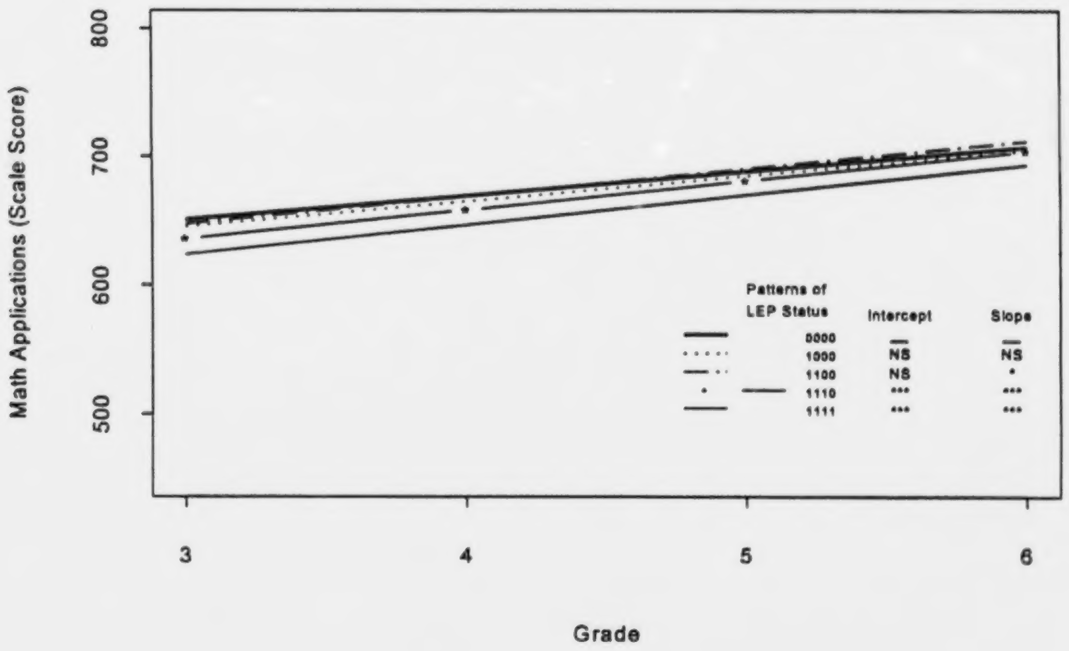


Exhibit 4.14 shows growth curves for the math computation scores of low-income students in the 1st grade cohort. Exhibit 4.15 shows the analogous information for low-income students in the 3rd grade cohort. In the 1st grade cohort, low-income LEP exiters had significantly *higher* initial test scores than low-income EP students, while LEP non-exiters were not significantly different from low-income EP students. In the 3rd grade cohort, both LEP non-exiters and fourth-year exiters had higher growth rates than low-income EP students, although non-exiters also had lower initial computation scores in 3rd grade. The other two groups of LEP exiters did not differ significantly from EP students.

These results suggest that, overall, after controlling for economic differences between LEP and EP students, the math achievement levels of LEP students—as measured by test scores—is not so different from that of EP students. Where low-income LEP students have lower initial scores, there is evidence that they move closer to low-income EP students over time.

STUDENT OUTCOMES: RETENTION IN GRADE

Grade retention is an important predictor of future educational success. Prior research has shown that students who have been retained are more likely to subsequently drop out of school (see, for example, Fine 1986; Wehlage and Rutter 1986).

As mentioned at the beginning of this chapter, we examined two measures of retention in grade. First, parents were asked if their child had ever been retained in grade. Second, we constructed an indicator of grade retention based on students' observed grade progression over the course of the study. Because the first measure covers all years in school, and the second measure covers only the years of this study, we expect higher retention rates from the first measure. The results presented below confirm this expectation.

Parents' Reports of Retention

For the 1st grade cohort, 19 percent of all LEP students and 14 percent of all EP students were retained in grade. For the 3rd grade cohort, this rises to 25 percent of LEP and 17 percent of EP students, according to parents' reports.

Exhibit 4.14

Math Computations Subtest
HLM Predicted Scores for LEP Exiters, LEP Non-Exiters, and EP Students
Low Income Students
1st Grade Cohort

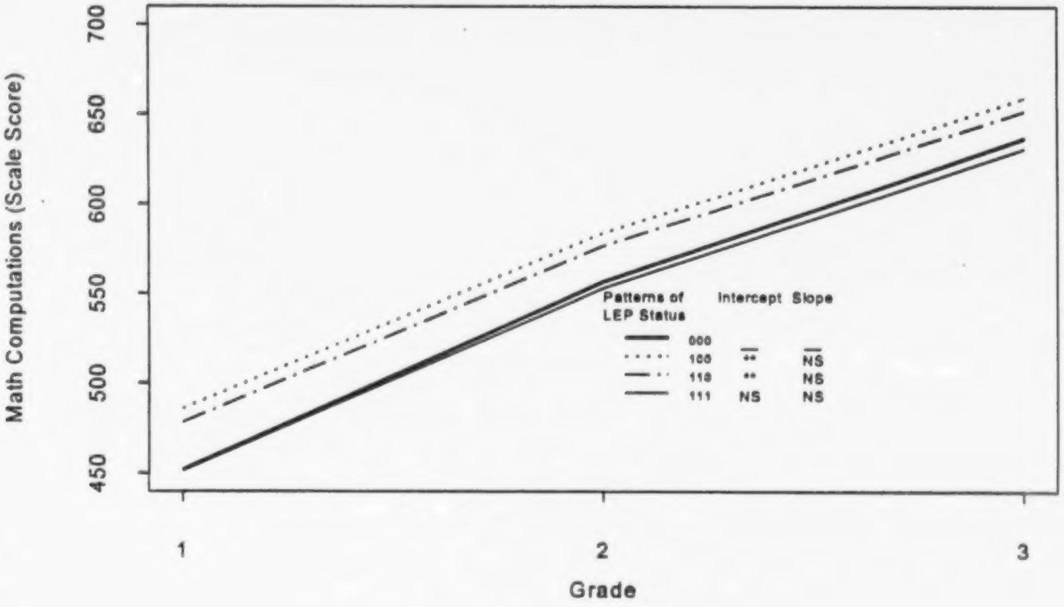
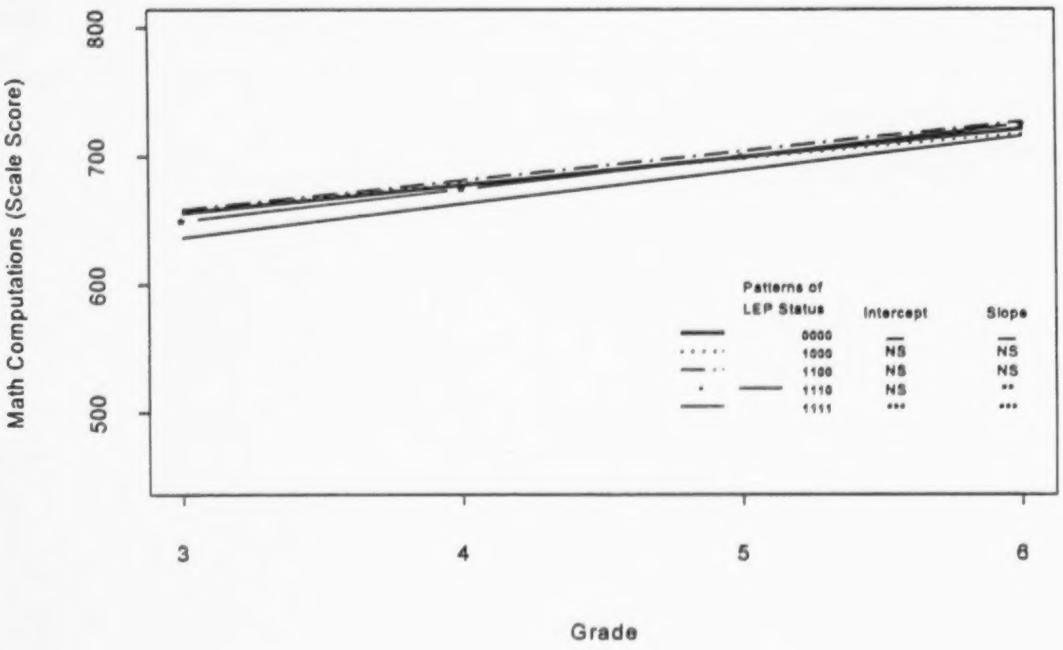


Exhibit 4.15

Math Computations Subtest
HLM Predicted Scores for LEP Exiters, LEP Non-Exiters, and EP Students
Low Income Students
3rd Grade Cohort



It is not surprising that the estimates for this cumulative measure of retention are higher for the 3rd grade cohort, because these students have been in school longer and therefore had more opportunities to be retained. The differences between the estimated retention rates for LEP and EP students are probably not large enough to be statistically meaningful, given the small unweighted sample size.

Retention Based on Observed Grade Sequence

For students in the 1st grade cohort, the normal and expected sequence of grades is to advance from 1st to 2nd to 3rd grade over the three years of the *Prospects* study. But, for example, students who repeat 1st grade in the second year have an observed grade sequence of 1st grade, 1st grade, 2nd grade. For convenience, we use the following notation to refer to students that followed particular grade sequences: "123" refers to students that followed the normal grade sequence, "112" refers to students who repeated 1st grade, "122" refers to students who repeated second grade, and so on.

Analogous notation was used to show grade progression for the 3rd grade cohort. For example, students who followed the normal sequence of third to fourth to fifth to sixth grade over the four years of the study are indicated as "3456."

Exhibit 4.16 shows the weighted frequencies of all LEP and all EP students in both the 1st and 3rd grade cohorts who followed the normal sequence, or repeated 1st, 2nd, 3rd, 4th, or 5th grade. Also shown is a breakdown of frequencies for LEP students according to their patterns of LEP status (i.e., always LEP, second-year exiter, third-year exiter, all other). The exhibit shows that, for the 1st grade cohort, similar percentages of LEP and EP students (about 6 percent) repeated 1st or 2nd grade.

For the 3rd grade cohort, less than 5 percent of LEP students and less than 3 percent of EP students were retained in 3rd, 4th, or 5th grade. The exhibit also suggests that *yearly* retention rates were generally higher for the 1st grade cohort than for the 3rd grade cohort, although the differences here are small and the pattern is not entirely consistent. In general, then, the grade sequence data provide no evidence that LEP students as a whole are retained more often than all EP students. Further, there are no consistent differences in retention rates among LEP non-exiters and second- and third-year LEP exiters.

Exhibit 4.16

Distribution of Grade Progression Patterns for LEP and EP Students

Grade Sequence	Percent of EP Students	Percent of LEP Students	Patterns of LEP Status				
			100	110	111	Other	
1st Grade Cohort							
Normal Sequence(123)	93.7%	94.1%	97.9%	96.8%	94.7%	89.1%	
Repeat 1st Grade(112)	3.1	3.9	1.4	0.8	2.5	10.6	
Repeat 2nd Grade (122)	2.7	1.7	0	2.3	2.5	.3	
Other	0.5	0.3	0.7	0.1	0.3	0	
3rd Grade Cohort			1000	1100	1110	1111	Other
Normal Sequence(3456)	97.0%	94.1%	99.0%	94.2%	96.0%	94.4%	91.2%
Repeat 3rd Grade(3345)	0.5	1.8	0.9	0.4	3.2	1.8	2.0
Repeat 4th Grade(3445)	0.6	0.7	0	0.9	0.3	0.3	1.6
Repeat 5th Grade(3455)	1.3	2.2	0	3.9	0	1.7	4.4
Other	0.4	1.2	0.1	0.6	0.5	1.8	0.8

Retention Rates for Low-Income Students

The grade retention patterns for low-income students are similar to the retention rates above, for all LEP and EP students.

Parents' Reports of Retention: Low-Income Students. Similar percentages of low-income LEP and low-income EP students were ever retained according to parents' reports. In the 1st grade cohort, 20 percent of LEP students and 23 percent of EP students were reported to have repeated a grade. In the 3rd grade cohort, parents said that 27 percent of low-income LEP students and 28 percent of low-income EP students had ever been retained.[21] Somewhat surprisingly, these results do not suggest higher retention rates for low-income students compared to all students. But the results are consistent with the results above in finding no clear evidence of higher retention rates for LEP students. If anything, LEP outcomes for retention are more closely aligned with those of EP students after controlling for economic status.

Retention Based on Grade Sequence: Low-Income Students. Exhibit 4.17 shows that about 4 percent of low-income LEP students and 10 percent of low-income EP students in the 1st grade cohort were retained based on the observed grade sequence measure (excluding the "other" category). The same exhibit shows that about 4 percent of low-income LEP and low-income EP students repeated 3rd, 4th, or 5th grade. As with all the other results, there is no evidence that LEP students had higher rates of retention.

SUMMARY

The key findings of this chapter are:

- Overall, after controlling for economic differences between LEP and EP students, the math achievement levels of LEP students—as measured by test scores—are not so different from those of EP students. LEP exiters in the 1st grade cohort generally had *higher* math test scores than EP students. Further, while some groups of low-income LEP students had lower initial test scores than low-income

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[21] Data were missing on this measure for 15 percent of LEP and 10 percent of EP students in the 1st grade cohort. In the 3rd grade cohort the percentages of missing data were 8 and 6, respectively.

Exhibit 4.17

Distribution of Grade Progression Patterns for Low-Income LEP and Low-Income EP Students

Grade Sequence	Percent of EP Students	Percent of LEP Students	Patterns of LEP Status				
			100	110	111	Other	
1st Grade Cohort							
Normal Sequence(123)	89.0%	96.2%	98.0%	97.0%	95.6%	97.0%	
Repeat 1st Grade(112)	5.3	2.1	2.0	1.6	2.2	2.2	
Repeat 2nd Grade (122)	4.6	1.4	0.1	1.2	1.9	.5	
Other	1.2	0.3	0	0.2	0.4	0	
3rd Grade Cohort			1000	1100	1110	1111	Other
Normal Sequence(3456)	94.9%	95.3%	99.8%	92.2%	95.8%	95.7%	93.1%
Repeat 3rd Grade(3345)	1.1	1.4	0	0.6	3.1	0.8	2.9
Repeat 4th Grade(3445)	1.3	0.9	0	0.7	0.4	0.4	2.6
Repeat 5th Grade(3455)	1.9	1.3	0	6.0	0	1.9	0.1
Other	0.9	1.1	0.2	0.4	0.7	1.3	1.3

EP students, there is evidence of catch-up; that is, LEP students' scores move closer to those of EP students over time. These same general results obtained for reading test scores, although the sample included in the reading score analysis was somewhat less representative (because it did not include SABE test takers).

- In general, for all the outcomes examined in this chapter—English proficiency, reading test scores, math test scores, and grade retention—LEP *exiters* have more favorable outcomes than students who are LEP in every year of the study.

- Further, differences between LEP exiters and students who are LEP in every year *begin with the first year observed.* This suggests that LEP exiters may begin school with certain advantages over other LEP students and that these non-school factors may play a role in their continued higher achievement. To put it another way, where LEP students end up appears to depend strongly on where they start. The results also suggest that LEP students are a heterogeneous group.

- We find no clear evidence that LEP students are retained in grade any more or less often than EP students.

POSTSCRIPT

LESSONS LEARNED AND AREAS FOR ADDITIONAL RESEARCH

This section presents some suggestions for future studies of LEP students, based on our experience with the *Prospects* study. Most of these suggestions have to do with measurement and collection of specific types of information, but we also make a few observations about study design. These observations are most relevant for other large-scale studies of LEP students involving collection of data at the student level.

Data Measurement and Collection

We believe that the following are important data collection goals for studies of LEP students:

The instruments for collecting data on language-related services should capture the wide variety of classroom practices. As other research has shown, a wide variety of instructional approaches are used to provide language-related services to LEP students. (See for example, Fleischman and Hopstock 1993.) There is not a simple split between bilingual education and English immersion approaches; there are many models in between and what happens in schools is likely to be a mix of different approaches. LEP students in the same classroom may even receive different language-related services, according to their needs. Data collection instruments must be able to provide accurate measurement in the face of this diversity. If a study's goal is to collect data on language-related services for a large sample of LEP students through teacher surveys, then it may be desirable to include as a study component some field observations of classroom practices, for a representative sample of schools and classrooms. This "ground level" view of services could be used to design a data collection instrument that would capture important distinctions in service provision.

In addition, as this study reports, a student's initial level of proficiency is a strong predictor of proficiency in subsequent years while the student is building full proficiency in English. Instructional practice (including access to language related services) often bases program assignments on the student's initial level of proficiency in English. That is, students are usually not randomly assigned to different programs but placed differentially, reflecting their level of proficiency when they enter the program. This has implications for evaluating the effectiveness of various instructional approaches for LEP students.[1]

It may also be important to distinguish between services *available* and services *received*. If the intent of a study is to analyze data on services received at the student level, it will likely not be sufficient to collect data on language-related services at the grade level or even at the classroom level. For example, a school may offer bilingual education in grades four through six, but that does not imply that a particular student received those services. As another example, if a student does not receive language-related services in a particular year, it matters whether the reason is that the student is no longer considered LEP, or that the school does not offer language-related services at that grade level.

Examples of other dimensions that may be important to measure are:

- *How much language-related services do students receive?* The provision of services is defined not just by the types of services, but also by the intensity of each. Ideally it would be useful to know how students spend their entire school day, in terms of time spent on each content area and by the language of instruction. (The former element is useful for comparing the content received by LEP students to that received by comparable EP students.)

- *How do language-related services change over time?* Because the acquisition of English proficiency typically takes a number of years, and because services will change as proficiency improves in different domains, it is useful to measure services received over time, rather than just at a point in time.

Although collecting accurate data on the provision of language related services should be a key focus, collecting information on instructional content is also critical. The educational outcomes of LEP students depend not just on the type or amount of language services, but also on the instructional content that schools provide to these students. A key question for understanding the educational services provided to LEP students is whether these students have the same opportunities to learn the same level of material in each subject area as EP students at the same grade level.

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[1] See, for example, Smith (1997), and Meyer and Feinberg (1992).

If teacher judgements are to be the principal source for measures of language proficiency, efforts must be made to verify their validity and level of measurement accuracy. This study relied primarily on teacher assessments of students' language proficiency. We believe these measures are valid, in part because they generate patterns of English proficiency growth that are consistent with other research, and because they are correlated with other indicators of proficiency such as standardized test scores and LEP exit rates. But teacher assessments of language proficiency have some drawbacks: they may be more accurate for assessing students' English proficiency than for assessing native language proficiency, especially when teachers are not themselves proficient in students' native languages; and they are subjective, which means that two teachers may make different assessments of the same student's proficiency. With respect to the former, at a minimum the study should collect information on teachers' own proficiency in the students' language. With respect to the latter, study designers should provide a clear set of standards for teachers to use in assessing proficiency, and these standards should be established for each of the proficiency domains. The standards should also be explicit about the appropriate reference group (e.g., other LEP students at the same grade level, native-English speakers at the same grade level).

An objective test of language proficiency is an alternative to using teacher judgements to measure language proficiency. Such a test is likely to measure proficiency more accurately, but it is also considerably more expensive to administer such a test than to ask teachers about students' language proficiency. Intermediate options include: administering an objective test to a subsample of study members, and using the results to benchmark teacher judgements; or attempting to utilize existing test score data from schools that have administered their own language proficiency tests. If teacher judgements are used, it is important to assess their validity. Absent resource constraints, the ideal approach would be to have multiple measures of language proficiency.

Where possible, teacher survey-based measures of student language proficiency should be validated utilizing more direct measures of student language proficiency. Where possible, such measures should also be used in a multiple indicator approach (utilizing additional survey questions, school records, or other measures) to strengthen measurement quality. The methods used to identify LEP students should be sensitive to legal requirements and other definitions of

LEP (e.g., the Title VII definition). It is important to capture the non-served LEP students, as well as those served.

The method used to identify students as LEP for study purposes should be sensitive to the processes used by district and school staff to identify students as LEP. Not only do states use different definitions of when a student should be classified as LEP, definitions and processes used to identify students as LEP can differ even across schools in the same school district. Further, although teachers do not make the formal designations of students as LEP, they determine the specific instructional activities for each student in their classroom, and the services provided may vary even for LEP students in the same classroom. Both the school-level and teacher classifications are useful, so one approach (used in this study) is to collect information on LEP status at the school-level and from the appropriate teachers. An advantage of this approach is that it identifies all and only those students who are the object of schools' efforts to increase proficiency. A disadvantage is that comparisons of LEP students across areas may be misleading to the extent that standards are different. It may be possible to supplement this approach by also including an absolute standard that could be used to make comparisons across sites.[2]

An alternative is to develop an objective measure, such as a standardized test of English proficiency, that can be applied to all sample members. Drawbacks of such an approach are that it is relatively expensive, and it may not identify the students who are the target of language-related services.

Depending on the goals of the particular study, it may be helpful to collect information not just on which students are LEP, but also on *how* schools identify students as LEP, and how schools determine that students are no longer LEP. Knowing something about these processes can be useful in designing a study, particularly for ensuring that the relevant data will be collected. This will enable researchers to define LEP status—including entry and exit—accurately.

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[2] If receipt of language-related services is used as a way to identify students as LEP, it is important to be able to distinguish between LEP and EP students in bilingual programs. In other words, the fact that a student is in a bilingual program does not imply that the student has limited English proficiency.

Family characteristics and the home environment can have strong influences on educational outcomes, and therefore should be part of the data collection. The results in this chapter suggest strongly that educational outcomes are determined in part by what students bring to school with them; i.e., by their home environment and language background. Development of strategies for mastering language takes place early in the lives of children; it is fostered by such things as family conversations and routine reading of books and other materials. Other potential "determinants" of language proficiency include the language background of parents and language use in the home, length of time in the U.S., and various measures of socioeconomic status. Beyond this, the effectiveness of language-related services during the observation period may be conditioned by students' prior educational experiences. If the goal of a study is to explain differences in outcomes for LEP students, it is important to collect these types of information, not just data on what happens in school during the study period.

As context for a study to determine the effectiveness of language-related services funded by Chapter 1 and perhaps Title VII, it would be useful to collect information on how Chapter 1 and Title VII funds are used to provide services to LEP students. The fact that Chapter 1 is a funding stream rather than a specific set of services makes it difficult to model the process by which Chapter 1 funds affect student outcomes, and therefore difficult to measure the effectiveness of the program. But if such an effort is deemed worthwhile, a logical starting point is to collect detailed data on how Chapter 1 funds are used to provide services to LEP students. This would include both language-related and non-language-related services, and follow-up services after students are no longer classified as LEP. Among other uses, such a study could inform the development of a model to measure program effectiveness. The effort would likely involve collecting information at the district and school level, and perhaps at the state level. Strang and Carlson (1991) is an example of such a study, based on a sample of fourteen school districts.

Research Design

Both broad and narrow studies of LEP students are needed. No single study, even one as ambitious as *Prospects*, can achieve all of the goals above. Some research questions are best addressed by studies that focus on a smaller sample of students and examine that sample intensively. Other research questions require a larger and more broadly representative sample of LEP students. The trade-off between the two types of studies is depth versus representativeness. Both types of studies are needed. It is also possible to integrate the two approaches by embedding a narrow study within a broader one.[3]

Accurately measuring program impacts requires extraordinary efforts to identify a comparison group. For many policy makers concerned about LEP students the research question of greatest interest is, "Does the Chapter 1 program improve educational outcomes for LEP students?" A necessary condition for answering this question is a research design that identifies a well-matched comparison group. As noted above, it is also desirable to have accurate data on how Chapter 1 funds are used. The best approach to measuring effectiveness from a research standpoint is likely to be a random assignment design. Virtually every major study of LEP students to date, including *Prospects*, has been a nonexperimental study. The limitation of such studies in this context is that it is difficult to identify a comparison group that is as disadvantaged as the students receiving Chapter 1 services. Consequently most simple comparisons of Chapter 1 students with other students, even other low-income students, will show lower outcomes for Chapter 1 students. Even with a careful statistical analysis, it is very difficult to control fully for the greater level of disadvantage of Chapter 1 students compared to other students. Well-executed random assignment designs eliminate this problem.

A random assignment design would need to address both ethical concerns and the multi-level nature of school organization. These issues have been resolved in other random assignment studies of educational interventions, so they should be resolvable in this context. One approach to addressing ethical concerns might be to vary not the level of Chapter 1 funds but the uses to which they are put. For example, it might be possible to vary the share of Chapter 1 funds used for language-related services versus other services. Such variation would mirror what likely occurs naturally, either because of differences in approach (e.g., early exit versus late exit), or due to other constraints (such as the inability to find and hire certified ESL or BE teachers). The multi-level nature of schooling—the fact that students are grouped within classrooms and classrooms are grouped within schools—may complicate the analysis of impacts, but probably does not lessen the usefulness of a random assignment design. If it is impractical to randomly assign students *within* a classroom, it may be possible to randomly assign classrooms within schools, or schools themselves.

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[3] See Meyer and Feinberg (1992) for recommendations on research design for studies of LEP students.

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APPENDIX A

PROCEDURES FOR IMPUTING LEP STATUS WHEN DATA ON INDIVIDUAL INDICATORS ARE MISSING

PROCEDURES FOR IMPUTING LEP STATUS WHEN DATA ON INDIVIDUAL INDICATORS ARE MISSING

Determination of LEP status for any sample member in any year involves three stages:

- Classification of individual LEP indicator variables;
- Imputation of missing values for those variables; and
- Derivation of overall LEP status.

Imputation of missing values is essential when conducting longitudinal analysis. Absent imputations, the total sample size for the longitudinal file would decline substantially as missing data compound across years. With eight source variables needed in each year--and some of those derived from several other variables (see below)--the potential for sample reduction grows quite large in a three- to four-year follow-up period if different sample members have missing data each year. This is true even when missing data rates are quite low for individual variables.[1]

Because of the high potential that data are not missing at random (MAR), imputation is also necessary to mitigate statistical bias that would result from analysis conducted for only those individuals with complete data. That is, imputation is necessary to maintain the ability of our samples to represent the populations of U.S. public school students from which they were drawn (1st graders in 1992, 3rd graders in 1991).

STAGE 1: CLASSIFICATION OF INDIVIDUAL LEP INDICATORS

We rely on eight variables, called the components of LEP, to classify a student as LEP or EP. A component can indicate the student is LEP, EP[2], or the component can be missing. The following describes each component and our procedure for classifying its value:

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[1] Appendix C presents missing data rates for each of the LEP indicator variables used in the analysis.

[2] We write that the student is classified as "EP" or "not LEP" by particular components, but most of the components cannot provide conclusive evidence that a student is not LEP. That is, each of the components can indicate a student is LEP, but the absence of an indicator does not necessarily indicate a student is EP. For example, knowing that a student participates in an English-as-a-second-language class is overwhelming evidence that a student has limited English proficiency, but a LEP student may not participate in an ESL class, because they are not available at their grade level or the school does not use this instructional method for LEP students, hence not participating in an ESL class is not conclusive evidence that a student is English proficient.

- **English- and Spanish-language limited for purpose of standardized testing:** The language limited variable is a designation (by the school) of whether the student could be meaningfully tested on an English- or Spanish- language cognitive test.[3] This variable is a composite of two variables from the Survey Control File. A student is classified as LEP by this component if s/he took neither the Comprehensive Test of Basic Skills (CTBS) nor the Spanish Assessment of Basic Education (SABE) for the *Prospects* study and was designated (by the school) as language limited for the purpose of standardized testing. Otherwise the student is classified as EP by this component. There is no designation of missing for this variable, because for students who took neither the SABE nor the CTBS, we can not differentiate between a negative response (no language limitation) and a non-response (missing data).

- **SABE:** This variable indicates whether or not a student took the Spanish-language cognitive test. This variable is derived from an indicator variable on the Survey Control File that indicates whether or not the student took the SABE for the *Prospects* study. A student is classified as LEP if s/he took the SABE test and EP otherwise. There is no designation of missing for this variable.

- **Teacher identifies as LEP:** This variable indicates whether or not the student's primary teacher believes the student is a limited English proficient student. Teachers were provided with an appropriate definition of a LEP student in the instructions to the Student Profile Questionnaire. The instructions defined LEP students as those "whose native language is other than English and whose skills in listening to, speaking, reading, or writing English are such that he/she derives little benefit from school instruction in English." The actual question on the Student Profile (question 16 in 1994) simply asks the teacher whether the student was "limited English proficient," with no definition stated in the question. By this component, a student is classified as LEP if the teacher responds that the student is limited-English proficient; EP if the teacher responds that the student is not limited-English proficient; and missing if the teacher did not answer the question.

- **Teacher indicates receipt of ESL services:** This variable is an indication of whether or not the student's primary teacher says that the student received English-as-a-Second-Language (ESL) instruction due to limited English proficiency. By this component, a student is classified as LEP if the teacher indicates the student receives ESL services; EP if the teacher indicates the student does not receive ESL services; and missing if the teacher did not answer the question. This variable is from the Student Profile Questionnaire (question 19a in 1994).

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[3] In the *Prospects* study, achievement tests were available in only English or Spanish.

- **Teacher indicates receipt of bilingual education services:** This variable is an indication of whether or not the student's primary teacher says that the student received bilingual education (BE) instruction. By this component, a student is classified as LEP if the teacher indicates the student receives BE services; EP if the teacher indicates the student does not receive BE services; and missing if the teacher did not answer the question. This variable is from the Student Profile Questionnaire (questions 19b and 19c in 1994).

- **Teacher indicates receipt of unspecified services due to limited English proficiency:** This variable is an indication of whether or not the student's primary teacher responds that the student received academic services due to limited English proficiency, but does not specify the type of services. If the teacher indicates the student receives ESL and/or BE services, the student is not classified as LEP by this component (because they are already classified as LEP by one of the above two components). Otherwise, a student is classified as LEP if the teacher indicates the student receives services due to limited English proficiency, but does not specify the type of service; EP if the teacher indicates the student does not receive services due to limited English proficiency; and missing if the teacher did not answer the question. This variable is from the Student Profile Questionnaire (question 18 in 1994).

- **ESL or bilingual education services from school records:** Identifying a student as LEP by this component is a two-step process. In the first step, we rely on two composite variables from the student's school records that indicate whether or a not a student receives ESL and/or Bilingual Education services funded through either the Chapter 1 program or another source. A student is classified as "possibly LEP" in the first step if either of the composite variables indicates that s/he received ESL or Bilingual Education services. If both the composite variables are present, and neither indicates that the student received ESL or Bilingual Education services, the student is classified as EP. If both composite variables are missing-- or either of the composite variables is missing and the composite variable that is present does not indicate LEP-- this component is classified as missing. Both composite variables are from the Student Abstract Questionnaire (questions 22 and 23a in 1994).

  The first step can only classify a student as "possibly LEP" rather than LEP, because the data extracted from school records does not indicate that the student is in bilingual education classes due to limited English proficiency (as the comparable data on the student profile, filled out by the students' primary teacher does), hence it is possible that the first step indicator can falsely identify some native English speakers as LEP students. This could occur if a native English speaking student is integrated with LEP students to become bilingual or serve as a role model, or if a native English speaker is taking a foreign language class. Hence, in order to identify a student as LEP by this criteria, the student must meet the first-step criterion as "possibly LEP" and also meet one of the second-step criteria.

  The second step criteria are: the student is identified as LEP by one of the other seven components used to identify a LEP student in at least one of the years covered by the survey; the student's parent reports a non-English language is spoken in the home most or all of the time (question 70 on the 1993 parent questionnaire); the student reports learning another language before English (question 12 on the 1994 Student Questionnaire); or the student's teacher indicates the student is a language minority student (question 15 on the 1994 Student Profile).

- **ESL teacher:** The ESL variable indicates if a student is designated for instruction by an ESL and/or Bilingual Education teacher who is not the student's regular or Chapter 1 teacher. This variable is from the school records and is contained on the Survey Control File. A student is classified as LEP for this component if s/he is designated for instruction by an ESL or Bilingual Education teacher who is not the student's regular or Chapter 1 teacher; and classified as EP otherwise. There is no designation of missing for this variable. Also, the data for this component was not collected in 1994, hence this component is not used to identify LEP students in 1994.

STAGE 2: IMPUTING VALUES FOR MISSING INDICATORS

In this stage, the missing values for each component variable are imputed to values of "LEP" or "not LEP." The basis of these imputations is clearest at the component level, and is strengthened by exploiting the longitudinal nature of the data, using information from years in which a component indicator is observed to impute its value in other (missing) years. Imputations only affect missing components; hence, observed data are never changed through imputation.

In general, we let the available data dictate our imputation rules. Two patterns in the non-missing data provide some general guidelines:

- Most LEP students in any year remain LEP the following year, and most EP students remain EP.
- In any given year, the great majority of all students are EP on any criterion.

The first pattern observed in the data leads to two guidelines for imputation:

- Impute so as to minimize the number of transitions between LEP and EP status; and
- Impute the student's earlier year status if the observed data in the years surrounding the missing year indicate a transition.

When the above two guidelines cannot decide the matter, we establish a third guideline based on the above mentioned observation that most students are EP on any criterion:

- Impute EP.[4]

Operationally, these three guidelines result in a three-part imputation procedure for each sample member and LEP component.

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[4] These three guidelines imply that we do not impute a student's status as LEP in a given year, unless the observed data indicate the student is LEP in at least one of the other years.

If data on a component are available for that sample member in an adjoining year or years and these years do not conflict: Fill in missing values to minimize the number of transitions between LEP and EP for that variable. For example, if a student has missing data for an indicator in the second year of a time series and the indicator variable equals "LEP" in the first and third year, impute a value of LEP for the middle year. Similar rules apply when the first and last year of a time series equal "not LEP", or if another position in the sequence is missing (and the surrounding years do not conflict), or if more than one year--but not all years--are missing.

If the component is missing in a middle year and the surrounding years conflict: This situation arises only in the middle year of a three-year sequence, when available data indicate LEP on one side of that year and EP on the other. This configuration will necessarily produce one and only one transition, regardless of what value one imputes to the middle year. So the "minimize transitions" principle cannot decide the case. Here, we follow our second guideline to impute the student's status in the prior year. For example, if a student is identified as LEP in the first year and EP in the third year, but the data on the middle year are missing, impute LEP for the middle year.

If the component is missing in all years: Impute EP in all years, following the observed pattern that a majority of students are EP in any given year.

STAGE 3: CLASSIFYING THE STUDENT AS LEP OR EP

Once missing data on individual LEP indicator variables is imputed at Stage 2, overall classification of a student as LEP or EP is straightforward:

- If any one of the eight component variables indicates that the student is LEP, the student is classified as LEP.
- If all eight components indicate the student is EP (i.e., do not provide evidence the student is LEP), the student is classified as EP.[5]

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[5] As an earlier footnote explained, if any one component does not indicate a student as LEP, it does not necessarily imply the student is EP. However, if all eight components do not provide evidence that the student is LEP, then that is strong evidence that the student is EP.

APPENDIX B

PROSPECTS STUDY DESIGN

PROSPECTS STUDY DESIGN

Prospects data provide a unique resource for examining critical policy issues related to Chapter 1, and for assessing a broad range of issues related to student and school educational outcomes. The *Prospects* study was developed in compliance with Section 1462 of the 1988 Hawkins-Stafford Amendments to the Elementary and Secondary Education Act, Public Law 100-297. This Congressional mandate required a "national longitudinal" assessment of the impact of Chapter 1 based on a comparison of the "educational achievement of those children with significant participation in Chapter 1 and comparable children who did not receive Chapter 1 services." The mandate further stated that the study "should be conducted throughout the country in urban, suburban and rural areas and shall be of sufficient size and scope to assess and evaluate the effect of the program in all regions of the country," and that the impact of Chapter 1 should be examined on a broad array of domains of interest including "academic achievement, delinquency rates, truancy, and school dropout rates."

To meet the Congressional mandate and the project schedule established by the U.S. Department of Education (ED), the collection of longitudinal data for *Prospects* was originally planned to be completed within a five-year period, beginning with baseline data collection in 1991 and ending with a final follow up survey at the end of the 1995-96 school year. (A provision in the legislation concerning follow up of young adults from age 18 to 25 was rescinded by Congress in 1990.) The original study design consisted of three longitudinal student cohorts:

- **1st grade cohort**: 10,820 students beginning 1st grade in the fall of 1991;
- **3rd grade cohort**: 10,333 students enrolled in the 3rd grade in the 1990-91 school year; and,
- **7th grade cohort**: 7,214 students in the 7th grade during the 1990-91 school year.

Each student was administered an annual achievement test, and those students in the 3rd grade or beyond were asked to complete a questionnaire about themselves and their experiences in and out of school. One parent (or guardian) for each sampled student was also asked to complete a questionnaire about the student's home environment. In addition, the sampled students' regular classroom teachers for reading/language art/English and mathematics, and (if any) the Chapter 1 reading/language arts/English or mathematics teachers (or aides) were also asked to provide information on classroom instruction and other educational activities. Data from regular and Chapter 1 teachers (or aides) on learning activities were intended to be linked to the student-level data.

Finally, information was also collected from school principals, Chapter 1 district coordinators, and students' school records.

The *Prospects* Sample Design. The main goal of the sample design was to ensure that the longitudinal surveys included a sufficient number of Chapter 1 participants (with substantial longitudinal exposure to the program "treatment") **and** a sufficient number of comparably disadvantaged children who did not have significant participation in the program. Consequently, the overall *Prospects* sample involved relatively fewer districts and schools, and relatively larger samples of students selected within a school. Thus, the *Prospects* sample was designed primarily to support analysis of program effects rather than maximizing sampling efficiency for reporting national statistical estimates of program characteristics.[1]

Under the provisions of a separate contract to determine the *Prospects* research design, several sample designs were evaluated for their suitability to meet the objectives of the study and for their cost effectiveness. The recommended design, and the one adopted by ED, included large samples (approximately 12,000) of students in the initial 1st grade and 3rd grade cohorts, and a significantly smaller sample (7,000 students) for the 1991 7th grade cohort.

Three stages of sampling were implemented for *Prospects*: [1] selection of a sample of school districts; [2] selection of a sample of schools within sampled districts; and finally, if necessary to limit the total number of students in a grade selected from any one school, [3] sampling of students in the designated grades within sampled schools. (See below for details on within-school sampling of students.) Stratification was used to improve sample efficiency at each stage. In the first stage of sampling, 120 districts were drawn from across all major strata, including the four Census regions (as prescribed by ED) and three levels of urbanization. Major sampling strata used for district selection are described in Exhibit B.1. Within strata, districts were selected proportionate to a measure of size (MOS) reflecting the estimated number of economically disadvantaged students, a measure highly correlated with district eligibility criteria for participation in Chapter 1.

Once the sample of districts was selected, district officials were canvassed to obtain information about the concentrations of disadvantaged students (i.e., those eligible for free or reduced price school lunches) and Limited English Proficient (LEP) students in each of their schools. Using information from the district canvass, schools in the sampled districts were then stratified based upon their proportions of poor and LEP children, and schools with higher concentrations were selected with higher probabilities. This approach increased the proportion of economically disadvantaged districts and schools in the sample compared to their proportion in the population,

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[1] See Bryant, E.C., Chu, A. and Hansen, M (1991) *Prospects: The Congressionally Mandated study of Educational Growth and Opportunity. Sample Design.* Bethesda, MD: Abt Associates Inc.

Exhibit B.1
Prospects Primary Sampling Strata

The *Prospects* design supports separate estimates for the four primary Census regions and for the three Census urbanization categories (urban, suburban and rural). However, the *Prospects* design does **not** provide sufficient precision for estimates for the three urbanization categories **within** the four Census regions.

The four **Census regions** include the following States (Washington, D.C. is included in the South):

Northeast: Maine, New Hampshire, Vermont, New York, Pennsylvania, Massachusetts, Connecticut, Rhode Island, New Jersey

South: Maryland, Delaware, Virginia, West Virginia, Kentucky, Tennessee, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Arkansas, Texas, Oklahoma, Louisiana, District of Columbia

Midwest: Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Kansas, Nebraska, Missouri, North Dakota, South Dakota

West: Washington, Oregon, Idaho, Montana, Wyoming, Utah, Colorado, Nevada, California, Arizona, New Mexico, Alaska, Hawaii

The three **urbanization** categories include:

Urban: Locations **within Central City** boundaries of a **Metropolitan Statistical Area**;

Suburban: Locations **inside** a **Metropolitan Statistical Area** but **outside the Central City boundaries;**

Rural: Locations **outside** a **Metropolitan Statistical Area**.

thus ensuring that the *Prospects* sample would include sufficient numbers of students eligible for and/or participating in Chapter 1 programs and in services specifically targeted at LEP students (i.e., Title VII).

The twelve largest public school districts were included in the *Prospects* sample with certainty (i.e., selection probability = 1.0). In most districts three schools were selected: two elementary schools and one middle or junior high school. However, to prevent excessive variability in the selection probabilities for schools and students, the four largest districts were selected with certainty.[2] This procedure reduces the difference in the selection probability for a student attending a school in one of the country's largest school districts and the selection probability for another student who attends a school in a smaller city, or a suburban or rural area. In the case of the four largest school systems, the numbers of schools selected ranged between six and ten. In total, 372 schools were selected for the *Prospects* core sample for the spring 1991 survey of the third and seventh grade cohorts. Of this total, 247 of the selections contained 1st and/or 3rd grades, while 137 contained 7th grades. Only 12 schools in the core sample contained only 1st grade students, 7 schools contained only 3rd grade students, and 12 schools contained all three selected grades.

The initial sample of districts and schools was designed to permit a predicted non-cooperation rate of 20 percent. However, after the sample was selected and during the district and school recruitment process, ED's Office of General Counsel ruled that districts and schools receiving Chapter 1 funds were required to participate in the evaluation. As a result over 95 percent of the sampled districts agreed to participate, a result that threatened to increase baseline data collection costs over budget amounts. To keep the sample size within statistical and budget parameters, in March of 1991 the sample of districts and schools was reduced by approximately 10 percent. The reductions in the sample were done randomly from strata containing districts and schools with the lowest percentages of disadvantaged students. Schools in "certainty" districts, and the stratum of schools with high percentages of LEP were excluded from this sample reduction.

Within most sampled schools, all students enrolled in all classrooms containing the target sample grades were included in the sample; only in schools with exceptionally large grade enrollments were students subsampled. The *Prospects* study thus includes **all** enrolled students within designated grades in sampled schools, with no exclusions on the basis of disability, lack of English proficiency, or any other reason. As explained in more detail below, certain types of sampled students were excused from specific data collection activities (e.g., cognitive testing or self-administered questionnaire administrations) if school staff identified them as unable to participate because of disabilities or lack of proficiency in the English or Spanish languages, or if a student's parent(s) refused to permit their participation. However, with the exception of parental refusals, all basic data elements (e.g., program participation information from student records, teacher evaluations, etc.) were collected for "excused" students wherever possible. Each sampled student is re-evaluated for ability to participate in each data collection activity for each follow-up survey. For example, if a formerly "excused" LEP student is classified by school officials as able to complete a questionnaire or test in English or Spanish, that student will be included in the survey and assessment sessions for the current survey wave.

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[2] Within the citywide New York City School District, six separate substrata of schools were formed. Four substrata of schools were formed in the next three largest citywide districts, Los Angeles, Chicago, and Philadelphia. For estimating sample sizes, this is equivalent to considering New York to be three districts, and Los Angeles, Chicago, and Philadelphia to be two districts.

Because the *Prospects* design selected all students within a grade, no special procedures were used to attempt to augment the subsamples of special population groups. Thus, Special Education students, migrant students, Gifted and Talented students, and members of racial and ethnic subgroups (such as African Americans, Asian or Pacific Islanders, Native Americans or Alaskan Natives, and students of Hispanic descent) are included in the sample in proportion to their numbers in the *Prospects* school sample. A sample supplement sponsored by ED's Office of Bilingual Education and Minority Language Affairs (described below) increased the proportion of schools in the sample with high concentrations of LEP students, and thus increased the proportions of these students in the sample.

In a small number of schools, enrollment sizes in designated grades were so large that subsampling of students within schools was required. Subsampling was done differently for elementary schools, which typically have self-contained classrooms, and for middle or junior high schools where the seventh grade cohort was selected. If the enrollment in a 3rd grade exceeded 125 students, four intact classrooms were selected at random from the list of five or more classrooms. This procedure usually yielded a sample of about 75 students. If a departmentalized middle or junior high school's 7th grade enrollment exceeded 125 students, a sample of 75 students was selected from the entire 7th grade student roster. For the fall 1991 baseline assessment of 1st graders, if the grade enrollment exceeded 100 students, three intact classrooms were sampled. The average sample size per school was approximately 70 students.

As indicated above, no restrictions were placed on the eligibility of students for the *Prospects* sample. However, at each sampled school, student rosters were annotated by school staff to identify students who were classified as LEP or as physically-, emotionally-, behaviorally- or learning-disabled. These children were included in the *Prospects* sample, but in consultation with knowledgeable school staff, were excused from both achievement testing and completion of self-administered questionnaires. LEP students judged by school staff to have adequate proficiency in the Spanish language were asked to complete self-administered Spanish-language questionnaires (if they were in the 3rd grade or above), and were tested using a Spanish-language achievement test battery (the Spanish Assessment of Basic Education or SABE) that has been calibrated to the

English-language Comprehensive Test of Basic Skills, Version 4 (CTBS/4). With the exception of the self-administered questionnaires and cognitive tests, every attempt was made to complete the remainder of the *Prospects* data collection protocol for all LEP and disabled students in the sample.

Schools Serving LEP Students. Analysis of the sample design developed to serve the core descriptive and evaluation objectives for the *Prospects* study indicated that the 1st and 3rd grade student samples would include too few students classified as having Limited Proficiency in English (LEP) for separate analyses of these students. To increase the number of LEP students, the Office of Bilingual Education and Minority Language Affairs (OBEMLA) supported a supplementary sample of 25 additional schools containing 1st and/or 3rd grade students, and having high concentrations (over 25 percent) of LEP students. Data collection activities parallel those used in the core *Prospects* sample of schools.

Survey Instruments. Eleven types of data collection instruments were used in the *Prospect* surveys:

- ***District Chapter 1 Coordinator Questionnaire*** -- District Chapter 1 Coordinators were asked to complete a self-administered questionnaire focusing primarily on system-wide policies and administrative operations likely to affect all school buildings within the district.

- ***School Principal Questionnaire*** -- The School Principal Questionnaire was a self-administered form which required principals to report statistical information on their schools similar to the type generally required by state Departments of Education (e.g., enrollment data). The questionnaire also included questions related to each principal's role, background, experience, and credentials, school policies, administrative leadership and decision-making techniques, perspective on teachers' attitudes, major challenges to the school staff, and information on Chapter 1 and other compensatory education programs and practices.

- ***Characteristics of Schools and Programs Questionnaire (CS&P)*** -- This questionnaire could be completed by the principal or delegated to other knowledgeable staff. This instrument focused primarily on the overall structure and organization of the school as well as the economic, sociological and demographic features of the school, its staff, and its student body.

- ***Regular Classroom Teacher Questionnaires*** -- The Regular Classroom Teacher Questionnaire collected detailed classroom-level information about the regular instructional program provided to the sampled students.

- *Chapter 1 Teacher/Aide Questionnaires* -- The Chapter 1 Teacher/Aide Questionnaire was similar in structure and content to the Regular Classroom Teachers Questionnaire but included sections that focused specifically on the nature of the compensatory services provided.

- *ESL/Bilingual Teacher Questionnaire* -- Questionnaires for ESL/bilingual teachers and aides were similar in structure and content to those for Regular Classroom Teachers, but included sections that focused specifically on the nature of the ESL/bilingual instructional services provided. (No ESL/Bilingual Teacher Questionnaire was distributed in 1994 as the LEP supplement was expected to end in 1993. LEP supplement data collection did occur in 1994 but without the ESL/Bilingual Teacher Questionnaire.)

- *Student Questionnaire* -- Students in grades three and beyond completed self-administered questionnaires in classroom settings. In 3rd and 4th grades, the survey administrator read each question aloud to ensure that students' reading ability did not affect their ability to complete the questionnaire. Separate questionnaires were used for elementary students (grades 3-5), middle school students (grades 6-8), and secondary school students (grades 9-12). The differences in the three grade-adaptive survey forms addressed differences in reading ability, school and classroom organization at the three levels, and the types of educational and social experiences considered most likely to affect student progress and achievement. Spanish language translations of the student questionnaires were available for use by Spanish speaking students with limited English proficiency. When Spanish questionnaires were used by 3rd grade students, a bilingual survey administrator was employed to read the questionnaire during the survey session.

- *CTBS/4 Achievement Test Battery (Reading and Mathematics)* -- The standardized achievement test used in *Prospects* is the Comprehensive Test of Basic Skills, fourth edition (CTBS/4). The CTBS/4 was selected for *Prospects* because the test measures both basic skills and higher order competencies taught in school and covers a broad range of age groups and grades. The following subscales were included in the *Prospects* data collection: Reading Vocabulary, Reading Comprehension, Total Reading, Word Analysis, Math Computations, Mathematics Concepts and Applications, and Total Math. Students that were determined to be unable to complete the CTBS/4 because of language constraints (if they were Spanish speaking) were either administered the Spanish Assessment of Basic Education (SABE), or omitted from this component of the data collection. The SABE, developed by CTB McGraw-Hill, is comparable in content coverage and structure to the CTBS series, and can be statistically equated to the CTBS/4 using a two-step crosswalk in which both the SABE and the CTBS/4 are related to the older CTBS Form U test battery.

The CTBS/4 was administered in a group setting at four different times over a four year period. The 1st grade cohort was administered the CTBS/4 in the fall of 1991, the spring of 1992, the spring of 1993, and the spring of 1994. The 3rd and 7th grade cohorts were administered the test in the spring of 1991, 1992, 1993, and 1994.

- *Parent Questionnaire* -- One parent of each sampled child was surveyed annually. The parent questionnaires were directed to the parent or guardian who considered him or herself to have the greatest involvement in the child's schooling. A telephone follow-up for missing questionnaires was made in 1992 and 1993. In 1994, the telephone follow-up targeted parents who had never returned a questionnaire in any year of the study as well as parents missing critical items. A Spanish-language version of the parent questionnaire was prepared and Spanish-speaking interviewers assisted with telephone and personal follow-up.

- *Student Record Abstract Form* -- The Student Record Abstract form was the primary means for recording information maintained at the school level about the range of educational services outside the regular program experienced by each student in each year of the study, as well as information on grades and attendance.

- *Student Profile* -- The Student Profile form collected a variety of ratings from the teacher (usually the regular classroom teacher) who knew the student best. These included the students' general and subject-specific ability and achievement, classroom behavior, attention and motivation, personality, and self-esteem. Teachers also indicated the presence of a variety of problems that might affect his/her school performance. Finally, this form includes a detailed series on teachers' assessments of the students' Language Minority/Limited English Proficient (LM-LEP) status and their language skills in both English and their native language.

At the request of the Department of Education, data collection was discontinued after the Spring 1993 survey for the 7th grade cohort, and all data collection ended for the other two cohorts in Spring 1994. Further, parent data were collected in Spring 1994 for only those parents who had either never responded in past survey rounds, or who were missing specific critical survey items. The forms, and their use in each study year are summarized in Exhibits B.2 and B.3.

Exhibit B.2: *Prospects* Instruments by Survey Year and Cohort

Survey date	Spring 1991			Fall 1991			Spring 1992			Fall 1992			Spring 1993			Spring 1994		
Cohort (baseline grade)	1	3	7	1	3	7	1	3	7	1	3	7	1	3	7	1	3	7
Current grade level		3	7	1			1	4	8	2			2	5	9	3	6	
District Chapter 1		x	x				x	x	x				x	x	x	x	x	
CS&P		x	x				x	x	x				x	x	x	x	x	
Principal Questionnaire		x	x				x	x	x				x	x	x	x	x	
Student Record Abstract		x	x				x	x	x				x	x	x	x	x	
Student Profile		x	x				x	x	x				x	x	x	x	x	
CTBS		x	x	x			x	x	x	x[1]			x	x	x	x	x	
SABE		x	x	x			x	x	x	x[1]			x	x	x	x	x	
Student Survey, Grades 3-5		x						x					x[2]	x		x	x[2]	
Student Survey, Grades 6-8			x						x					x[2]	x[2]		x	
Student Survey, Grades 9-12															x			
Classroom Teacher		x	x				x	x	x				x	x	x	x	x	
Chapter 1 Teacher		x	x				x	x	x				x	x	x	x	x	
ESL Teacher		x	x				x	x	x				x	x	x			
Parent Questionnaire		x	x				x	x	x				x	x	x	x[3]	x[3]	
Survey Control File		x	x				x	x	x				x	x	x	x	x	

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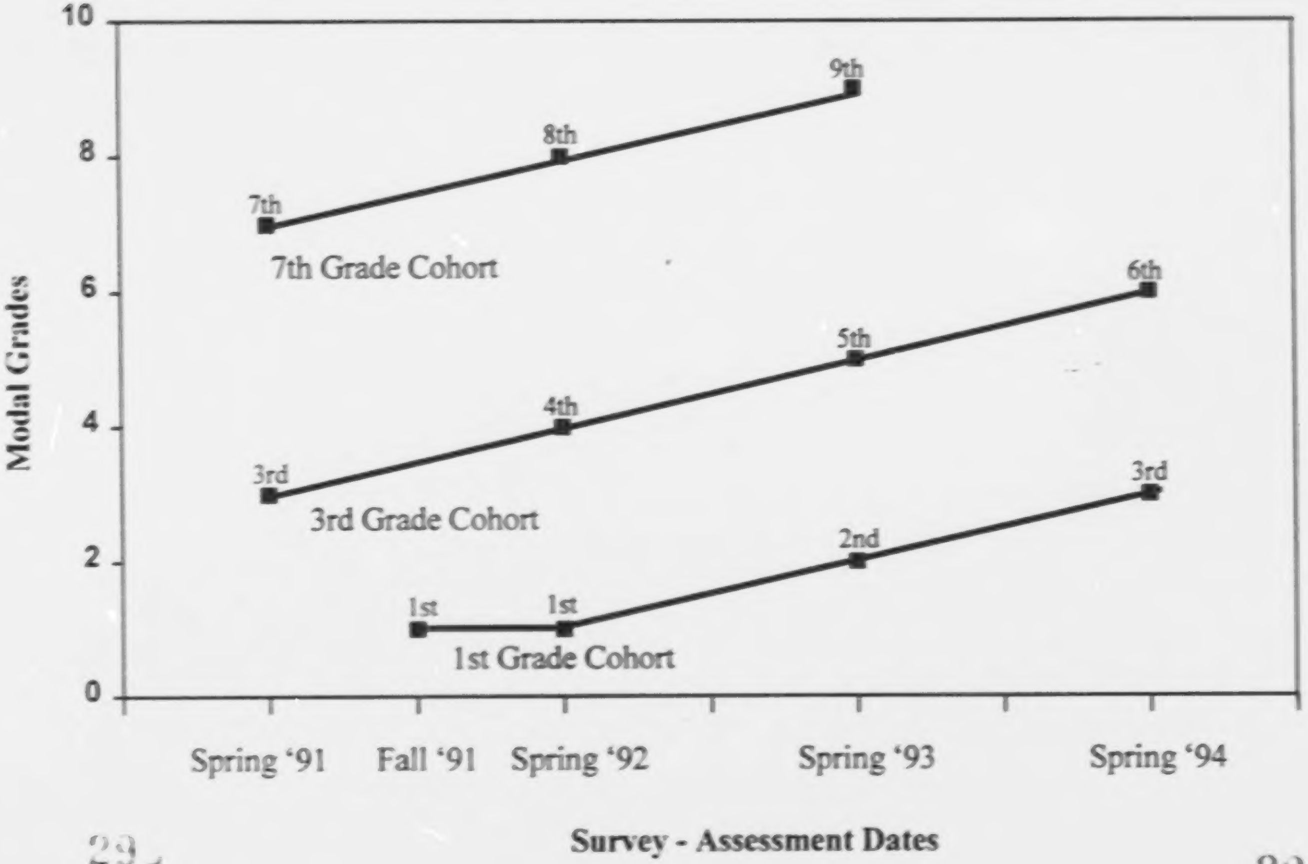
[1] Fall 1992 tests were given to a subsample of the Grade 1 Cohort.

[2] For off-track (retained or accelerated) students in this cohort.

[3] Phone survey of parents with missing critical-item data from earlier years.

Exhibit B.3: *Prospects* Data Collection Points by Study Cohort



APPENDIX C

MISSING DATA RATES FOR VARIABLES USED TO IDENTIFY LEP STUDENTS

Exhibit C.1

Percent of Students in Population with Missing Data on Individual LEP Components and the Overall LEP Indicator, by Cohort and Year

	First Grade Cohort		
	1992 (1st grade)	1993 (2nd grade)	1994 (3rd grade)
Identified by school as LEP for purposes of *Prospects* standardized achievement test	0[a]	0[a]	0[a]
Took Spanish-language test (SABE)	0[a]	0[a]	0[a]
Identified as LEP by teacher	19.2	25.1	22.6
Recipient of ESL instruction, classification by primary teacher	19.4	25.3	20.6
Recipient of bilingual education instruction, classification by primary teacher	19.3	25.2	20.6
Recipient of unspecified services due to limited English proficiency, classif. by primary teacher	19.3	25.2	20.6
Recipient of ESL or bilingual education instruction, from school records	19.5	25.2	20.5
Associated with an ESL and/or bilingual education teacher that is not their regular or Chapter 1 teacher	0[a]	0[a]	0[a]
OVERALL LEP INDICATOR[b]	23.1	26.8	24.3

[a] No designation of missing for this variable.

[b] Overall LEP indicator is defined as missing if at least one of the eight component variables is missing, and the components that are present indicate "not LEP."

Exhibit C.1
Percent of Students in Population with Missing Data on Individual LEP Components and the Overall LEP Indicator, by Cohort and Year (continued)

	Third Grade Cohort			
	1991 (3rd grade)	1992 (4th grade)	1993 (5th grade)	1994 (6th grade)
Identified by school as LEP for purposes of *Prospects* standardized achievement test	0[a]	0[a]	0[a]	0[a]
Took Spanish-language test (SABE)	0[a]	0[a]	0[a]	0[a]
Identified as LEP by teacher	12.1	18.9	23.3	25.7
Recipient of ESL instruction, classification by primary teacher	12.8	19.1	23.6	21.8
Recipient of bilingual education instruction, classification by primary teacher	12.4	19.2	23.7	21.9
Recipient of unspecified services due to limited English proficiency, classif. by primary teacher	12.6	19.1	23.6	21.9
Recipient of ESL or bilingual education instruction, from school records	7.3	13.9	15.7	17.8
Associated with an ESL and/or bilingual education teacher that is not their regular or Chapter 1 teacher	0[a]	0[a]	0[a]	0[a]
OVERALL LEP INDICATOR[b]	16.1	22.8	26.3	30.9

[a] No designation of missing for this variable.

[b] Overall LEP indicator is defined as missing if at least one of the eight component variables is missing, and the components that are present indicate "not LEP."

APPENDIX D

TREATMENT OF MISSING DATA

TREATMENT OF MISSING DATA

The previously described structure of the *Prospects* survey (see Appendix B) involved the collection of data from a variety of sources, including students, parents, teachers and school officials, over a period of time of up to four years. However, not all data were available for every student for all years, and for instruments that were completed, some items of information might be missing. This situation is the norm in most large, national, longitudinal studies. Because there was such a great potential for analysis variables to be unavailable, and because data could not be assumed to be missing completely at random, an analysis of only those individuals with complete data would have been inappropriate. Consequently, missing data imputation procedures were undertaken to obtain the best possible estimates of missing values, whenever possible.

Several properties of the *Prospects* data make it particularly well suited for such an imputation of missing data. First, many variables are defined in each of the four survey years; some of these, such as test scores, would be expected to increase year by year, while others, such as demographic characteristics, would be more likely to remain constant. Second, some variables are reported by more than one source, or are closely related to variables reported by another source. Third, some variables are closely related to others within the same instrument, for example, a group of questions designed to be combined into a scale of student self concept. The high correlations resulting from the multi-year, multi-source nature of the data base support the estimation of missing values.

Imputation was done on all available variables to obtain maximum likelihood estimates, iterating to within a convergence criterion of 0.001 for school variables, and 0.0001 for all other variables. Sample sizes were large enough that the possibility of overfitting was not a constraint. Data for each cohort was processed separately, sample weights were not used in the estimation process, and imputations were done separately for four groups of variables: outcomes, demographic/background variables, school variables, and teacher/classroom variables.

Limits were set on the amount of missing data allowed before a variable could be included in the imputation procedure. Variables were included only if they had data for at least 50 percent of eligible cases. The actual incidence of missing data was generally much less than this cutoff level would suggested. Eligibility was defined as having had an opportunity to provide data. For example, in 1991, 312 schools were attended by at least one student in our sample. As a result, at least 156 (50%) of the 312 schools would have to have non-missing data on a particular 1991 school-level variable in order for estimates to be computed for the remaining first year schools. For a very few critical variables, the 50 percent standard was waived when the incidence of missing data fell only slightly below the cutoff, and if the particular variables were highly correlated with other variables in the group.

For the school- and teacher-level variables, limits were set for amounts of missing data within each observation as well as for each variable. School and teacher records had to have at least 25 percent of the variables measured to be included in the imputation process. While this may seem quite low, the strong intercorrelations among variables within each group drove the selection of this cutoff, and in fact, most observations were at least 80 percent complete for each group of variables.

The *Prospects* data underwent additional processing steps both before and after the actual imputation procedures. Prior to imputation, all variables were examined for reasonableness of means and ranges. The diversity of the sample and the data sources suggested a substantial potential for errors in data collection due to misunderstanding questions and problems in responding. Since correlations can be severely affected by extreme values, range limits were set for each variable. Caution was also taken to avoid discarding data that might be correct, but some values were so implausible that they were extremely unlikely to represent the intended answer to the question that was asked. Categorical variables (such as race/ethnicity and urbanicity) were redefined as a set of (0,1) variables for estimation purposes.

Post-processing steps were also necessary for preparing the imputed data for use in later analyses because some estimated values fell outside the valued ranges. Values below the minimum were raised, and values above the maximum were, therefore, lowered as necessary. The valid ranges were defined in several ways: either by a theoretically fixed range if available (such as 0-100 for a variable representing a percentage of students with some characteristic), or by defining the limits to be the range occurring in the observed data, or by extending the observed range if a higher number could plausibly be correct. Most dichotomous variables were rounded off to integers, except for some with extreme splits and those that would probably be combined with others to compute a scale. Categorical variables that had been redefined as a set of (0,1) variables for imputation were returned to their categorical form by selecting the highest value (analogous to the estimated probability) occurring in the observed data.

The remainder of this appendix describes special circumstances and treatments for each of the separate categories of variables for which missing data was filled in; outcome variables, demographic/background variables, school variables, and teacher/classroom variables. This report used many of the analysis variables that were imputed for another *Prospects* report (see Puma et al., 1996) and details on the imputation of missing data for these variables are described below. Following these descriptions is a description of the imputation of missing data for additional variables that were used only in this report. These variables primarily concern language proficiency of LEP students and their parents and educational services specific to the needs of LEP students.

Outcome Variables

The outcome variables for each cohort contained four subtest scores (Reading Vocabulary, Reading Comprehension, Math Computation, and Math Concepts and Applications) in each of the four years of the study. A single overall report card grade (in year 1) and three separate grades for English, reading/language arts, and math (in years 2-4) were obtained from school records. Responses to questions on the Student Profile instrument filled out by each student's teacher were used to construct scales for Cooperation/Compliance, Participation in Class, and Attention/ Motivation in each of the years; teachers in each year also rated each student's achievement relative to grade level for English, reading/language arts and math.

Imputations were therefore computed for 42 outcome variables for the 1st grade cohort and 50 for the 3rd grade cohort. Most variables had missing data for 10-25 percent of the sample. R^2's for most variables were between 0.60 and 0.80. The Participation in Class scales were less well predicted in all years for all cohorts, with R^2's of about .30. English and math grades had R^2's that were close to 0.60 for the 1st and 3rd grade cohorts. However, the report card grades, which were collected from school records, had among the lowest missing data rates of the variables in this group.

Although the rates of missing data were fairly low, an additional post-processing step was undertaken for the outcome variables to preserve the variances of the observed scores. Complete data cases were used to regress each outcome variable on all of the others, and predicted scores and residuals were obtained. Then each imputed value was modified by adding to it a residual randomly chosen from the pool for that individual's gender by ethnicity group (e.g., black males). The resulting estimates were not subjected to range limits.

Demographic\Background Variables

The demographic/background datasets contained student, parent, family and community variables for each year of the study. Composites or averages across years were used for some variables that might be expected to remain fairly constant in order to minimize the amount of missing data that would need to be imputed. Student variables consisted of age, gender, ethnicity, grade, LEP status, preschool history, disabilities, and health problems. Parents' education and occupation, their contacts with and rating of the child's school, and their expectations for the child's academic future were also included. Family variables included family composition, size, mobility and SES measures.

Urbanicity and region of the country had no missing data; they were included in the imputation process as correlates of other variables. There were 48 demographic variables for the 1st grade cohort and 59 for the 3rd grade cohort (the only cohort with data collected in all 4 years). In each case, five of these variables were region and urbanicity indicators; the rest had missing data that were imputed. Missing data rates were typically well under ten percent for variables for which observations were combined across years (e.g., ethnicity and items in the home), but tended to be around 20 percent for most other variables. Data for mother's education, income, and occupation were sufficiently complete to be included in the imputations; however, for fathers, only education was available for enough of the sample. R^2's for the demographic variables were generally between about 0.30 and 0.65. The measures of student health problems and family mobility were not highly correlated with the other variables in this group.

Post-processing steps consisted of shrinking extreme imputed values to valid ranges, and rounding dichotomous variables. The small amounts of missing data for ethnicity (ranging from 1-4%) were imputed by selecting the imputed (0,1) variable with the highest estimated value (probability).

School Variables

School variables for which missing data were imputed included urbanicity, school size and grade span, participation in Chapter 1 and Schoolwide programs, principal's education and years of experience, and use of tracking. Measures of school climate included decision making processes, consensus on goals, and frequency of disciplinary actions. Some school variables were aggregates of student characteristics, including the proportion of students in the school who are black, white, or Hispanic, LEP, have reading scores below the 25th percentile, and whose families are below the poverty line. Attendance rates, teacher and student mobility rates, and student/teacher and student/staff ratios completed this set of 70 school measures.

Of the 2,421 schools that had at least one student participating in at least one wave of data collection, 661 provided little or no school data. Imputations were performed for missing data for the remaining 1,760 schools as a group, without separating them by cohort. Because the highest correlations were across different variables at the same school and because we included indicators of the grade levels taught in the school, the combining of cohorts did not present a problem.

Missing data rates were much higher than for the other sets of variables because few schools had been in the sample in all four years. As sampled students spread out to other schools over time, their new schools were added to the data collection. In order to avoid the necessity of dropping variables that had high rates of missing data, many of the school variables used in the imputation procedures were constructed as composites across years, for measures that could be expected to be reasonably stable over time. The requirement for at least 50 percent observed data was then applied to schools that ***should*** have had data, either for an individual year in which the school was present in the sample, or for a composite. Correlations among school variables tended to be high, with R^2's greater than 0.45 for most variables. About half of all variables had R^2's of 0.85 or higher. As above imputed values were trimmed to conform with valid ranges, and dichotomous variables were rounded.

Teacher and Classroom Variables

Information on teacher characteristics and classroom procedures were collected from each student's math teacher and reading/language arts/English teacher. Teacher variables included ethnicity, highest academic degree, years of teaching experience, certification, time in-service, number of teachers in the classroom, and use of classroom aides. Classroom characteristics included ability grouping, the proportion of time used for whole group instruction, use of computers, availability of sufficient materials, minutes per week of instruction in the subject area, and hours per week of homework. Teachers also reported aggregated student characteristics such as the percent of Chapter 1 and LEP students in the classroom, the percent below grade level in the subject, the number of Chapter 1 students served within and outside of the classroom, and class size. They also rated community climate, their relationships with staff and the school/district administration, and their ability to influence school policy. Several factor scores were constructed from the teachers' responses. For math teachers, these included composite measures of their dependence on remedial instructional, and use of higher order thinking skills and advanced math. In the reading/language arts/English classrooms, factor scores for their dependence on remedial instruction, any use of comprehensive, writing and reading/writing integration were obtained. Not all variables were defined for each cohort or for each subject area. Imputations of missing data were estimated separately for math and reading/language arts/English teachers within each of the cohorts. The unit of analysis was the student, with the teacher/classroom variables attached to each student reported on by that math or reading/language arts/English teacher. The 1st grade cohort had 79 math teacher variables and 83 variables for reading/language arts/English teachers; and the 3rd grade cohort had 110 variables for each subject area. In each of the two cohorts, between three and four percent of students had too little teacher data available for imputations to be estimated for missing values. Almost all variables had missing data rates between 10 and 30 percent. R^2's varied widely, with the majority falling between 0.30 and 0.50. Higher R^2's were obtained for variables related to classroom composition, such as the presence of LEP and Chapter 1 students, and the number served within and outside of the classroom. Factor scores also tended to be highly correlated with other variables, especially for the 3rd grade cohort. Variables including minutes per week of classroom time on the subject, and hours per week of homework, were less well predicted for the 1st grade cohort. The number of teachers in the classroom was not highly correlated with other variables, probably because it was equal to one for the great majority of observed cases.

Additional Variables for the LEP Report

After imputed values had been estimated for missing data for all of the groups of variables described above for the main study, additional sets of variables were selected for analysis of Limited English Proficient (LEP) data in the 1st and 3rd grade cohorts. Groups of language variables, demographics, school and teacher measures were linked with the previously imputed variables, and missing data procedures were undertaken.

The additional LEP outcome variables were imputed only for those sample members who had been identified as LEP at some time during the data collection: 1,642 students in the 1st grade cohort and 1,739 in the 3rd grade cohort. These variables consisted of measures of student proficiency in speaking, understanding, reading, and writing English for each year of data collection, as reported both by the teacher and by the student's self assessment. The same measures of proficiency in use of the student's non-English language were reported by the teacher only. A dichotomous variable indicating whether English was the parents' native language, as well as measures of frequency of use of English in the home and average parents' English proficiency completed this set of variables. The 43 language variables for the 3rd grade cohort (23 for the 1st grade cohort, which had no 1991 data collection) were merged with selected previously imputed variables from the main study to provide correlates for prediction. These included ethnicity, urbanicity, and several SES measures. Missing data rates for language variables in both cohorts were generally close to 20 percent, with much greater amounts of missing data for teacher reports of native language proficiency. R^2's for the 1st grade cohort were greater than 0.70 for more than two-thirds of the variables, and at least 0.33 for the rest. In the 3rd grade cohort, R^2's exceeded 0.45 for all language variables, and 0.70 for over half. The only post-imputation processing procedure employed was shrinking imputed values to valid ranges; variables were not rounded because most of them might later be combined to construct scales.

The additional demographic\background variables to be used in the LEP report had missing data imputed for all sample members, not only LEP students. These variables were family income, male and female parent's or guardian's employment in each year, average parental occupational status, participation in the free lunch program, time spent alone at home, and parents' interactions with the student with respect to school expectations, future goals, language use, and rules. Six self concept questions were obtained from the student questionnaire. This set of variables was merged with the previously-imputed main report demographic\background variables, which were held constant to provide predictors for imputation of the new variables. With employment variables (full time, part time, homemaker, unemployed, other) for each year separated into five (0,1) variables for each parent, there were a total of 44 demographic variables added for the LEP analysis for the 1st grade cohort, and 59 for the 3rd grade cohort.

Missing data rates for these variables were generally under 30 percent, except for higher nonresponse rates for the male parent/guardian's employment and parent occupation variables, especially in the first year of data collection. Student-reported self concept variables, time alone, and discipline were not highly correlated with the other variables in this group, with R^2's mostly well below 0.20. R^2's for parent employment variables generally ranged between about 0.20 and 0.50. The other variables in this group were somewhat better predicted, with R^2's mostly greater than 0.50. Imputed values were rounded to the nearest integer only for the 10-step income variables; exact estimates were preserved for all other variables. The categorical variables for parent employment were reconstructed from the imputed (0,1) variables by selecting as most probable the category with the highest imputed value in each group.

For the LEP analysis, 44 school variables were also added to those for which missing data had already been imputed. Missing data estimation procedures were applied to the new set of variables for the same 1,760 schools as for the main report, and the original set of 70 variables was merged with the new data to provide correlates for imputation. The LEP school variables measure the presence of LEP and Chapter 1 students in the school, the principal's qualifications in English-as-a-Second Language/bilingual education instructional issues, integration and coordination of programs and instruction for LEP and Chapter 1 students, services to LEP students' parents, parents' perceptions of students school experiences, number of days in the school year, and teachers' perception of safety. As for the main study, the requirement that each variable have observed data for at least 50 percent of cases was defined to refer to 50 percent of the schools that had been in the sample in the year that the variable was collected. Intercorrelations among this group of variables were high, resulting in R^2's of 0.50 or greater for about three quarters of the variables. The only variable that was not well predicted from the other data was number of days in the school year ($R^2 = 0.17$), which varied very little among schools.

The **teacher and classroom variables to be used in the LEP report** also had missing data imputed for all sample members, not only LEP students. As with the main report teacher and classroom variables, separate imputations were done by cohort for math and reading/English/language arts variables. The original set of main-report variables were merged with the new data to provided correlates for imputation.

The additional teacher variables included certification in ESL and/or BE instruction and non-English language proficiency. Classroom variables included whether students receive ESL/BE instructional services, percent of classroom instruction in non-English language, availability of computer hardware and software, and the type of instructional materials used for LEP students. The 1st grade cohort had 44 reading/English/language arts teacher variables and 35 math teacher variables added for the LEP analysis; while the 3rd grade cohort had 52 reading/English/language arts teacher variables and 40 math teacher variables added for the LEP analysis. Almost all variables had missing data rates between 10 and 30 percent prior to processing.

APPENDIX E

PROCEDURES FOR CALCULATING COMPOSITE SCORES FOR INSTRUCTIONAL EMPHASIS

PROCEDURES FOR CALCULATING COMPOSITE SCORES FOR INSTRUCTIONAL EMPHASIS

In each year during the *Prospects* study period, classroom reading/English/language arts and math teachers were asked how much emphasis they placed on approximately 25 subject-specific skills in the class attended by each student in the *Prospects* sample.[1] For each specific skill, teachers were given the option of responding that they placed: major emphasis on this skill (coded as 3); moderate emphasis on this skill (coded as 2); little emphasis on this skill (coded as 1); no emphasis on this skill (coded as 0); or the skill was not applicable to their class (recoded as 0).

To help group the multitude of specific skills that reading/English/language arts and math teachers might emphasize into a more manageable, and meaningful, grouping of primary skills emphasized in instruction, factor analyses were undertaken. After analyzing the results of the factor analyses, the bundles of specific skills that were associated with an underlying, primary skill were identified. The composite score for the underlying skill is simply the average level of emphasis placed on each specific skill that is associated with the underlying skill.

Factor analyses were performed separately for reading/English/language arts and math classes, and for each year and cohort to reflect differences in developmentally appropriate skills. The factor analyses were done at the classroom level using maximum-likelihood estimation and oblique rotations using the promax method. Below is a general description of the underlying skills, by subject. The results of the factor analyses follow these descriptions, in Exhibits E.1 to E.5. In these exhibits, the column headings list the factors, with the factor means and factor alphas directly below them. The row headings list the specific skills (items) for which teachers were asked to report the degree of emphasis they place on them in class. The cells in the exhibit show the factor loadings for each item on the factors listed in the column heading. Inter-factor correlations are reported in the bottom panel of these exhibits.

Underlying Skills a Reading/English/Language Arts Teacher Might Emphasize in Class

Our examination of the factor analyses results indicated that there are seven underlying skills a reading/English/language arts teacher might emphasize in their classes containing students in the *Prospects* sample. A brief description of each of these skills is provided below.

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[1] See question L22 on the 1992 Reading/English/Language Arts Teacher Questionnaire and question F11 for reading/English/language Arts teachers and F12 for math teachers on the joint-subject Classroom Teachers' Questionnaire in 1994. These are the questions on instructional emphasis used in this report.

Exhibit E.1
Factor Analysis for Reading/English/Language Arts Instructional Emphasis
3rd Grade Cohort, 1992 (N=940)

	Writing Attitudes-Skills mn= 2.39 (.60) alpha=.85	Reading Comprehension mn=2.60 (.45) alpha=.86	Application mn=1.81 (.71) alpha=.79	Reading Attitudes mn=2.83 (.37) alpha=.83	Remedial-Typical mn=2.04 (.60) alpha=.69
Reading readiness	---	---	---	---	0.66
Listening	---	---	---	---	0.52
Word analysis	---	---	---	---	0.55
Vocabulary	---	0.41	---	---	---
Manuscript writing	---	---	---	---	0.49
Cursive writing	0.50	---	---	---	---
Spelling	0.63	---	---	---	---
Writing/comp.	0.77	---	---	---	---
Grammar	0.68	---	---	---	---
Follow directions	---	---	---	---	0.32
Comp. facts/details	---	0.69	---	---	---
Identify main idea	---	0.83	---	---	---
Sequence of events	---	0.78	---	---	---
Fact from opinion	---	0.75	---	---	---
Draw inferences	---	0.68	---	---	---
Read charts/graphs	---	0.50	---	---	---
Study skills	---	---	0.60	---	---
Life skills mater.	---	---	0.86	---	---
Evaluate reading.	---	---	0.77	---	---
Oral comm. skills	---	---	---	---	---
Appreciate reading	---	---	---	0.72	---
Appreciate writing	0.73	---	---	---	---
Confidence to read	---	---	---	0.82	---
Confidence to write	0.69	---	---	---	---
Value reading	---	---	---	0.73	---

Exhibit E.1 (continued)
Factor Analysis for Reading/English/Language Arts Instructional Emphasis
3rd Grade Cohort, 1992 (N=940)

Inter-Factor Correlations

	1	2	3	4	5
1-	1.0				
2-	0 28	1.0			
3-	0.40	0.39	1.0		
4-	0.38	0.33	0.32	1.0	
5-	0.25	0.28	0.20	0.8	1.0

Exhibit E.2
Factor Analysis for Reading/English/Language Arts Instructional Emphasis
1st Grade Cohort, 1994 (N=1,490)

	Writing Attitudes-Skills mn= 2.25 (.66) alpha=.86	Reading Comprehension MN=2.46(.50) alpha=.84	Application mn=1.74 (.67) alpha=.75	Communication-Integration mn=2.21 (.52) alpha=.84	Remedial-Typical mn=2.32 (.41) alpha=.73
Reading readiness	---	---	---	---	0.46
Listening	---	---	---	---	0.47
Word analysis	---	---	---	---	0.65
Vocabulary	---	---	---	---	0.46
Grammar	---	---	---	---	0.42
Spelling	---	---	---	---	0.48
Reading aloud	---	---	---	0.47	---
Identify main idea	---	0.77	---	---	---
Sequence of events	---	0.81	---	---	---
Predict events	---	0.83	---	---	---
Get author's intent	---	0.58	---	---	---
Compare readings	---	---	0.33	---	---
Integrate reading	---	---	---	0.54	---
Oral comm. skills	---	---	---	0.44	---
Persuasive writing	---	---	0.70	---	---
Narrative writing	---	---	0.47	---	---
Daily journals	---	---	---	0.44	---
Gr./voc. by writing	0.56	---	---	---	---
Writ./Comp. skills	0.74	---	---	---	---
Writing process	0.65	---	---	---	---
Controlled vocab.	---	---	---	---	0.47
Write about lit.	---	---	---	0.50	---
Read novels/plays.	---	---	---	0.51	---
Read out of class	---	---	---	0.45	---
Creative projects	---	---	---	0.68	---
Integrate read/write	---	---	---	0.70	---
Choice of reading	---	---	---	0.62	---
Technical writing	0.45	---	---	---	---
Know phonetics	---	---	---	---	0.61

Exhibit E.2 (continued)
Factor Analysis for Reading/English/Language Arts Instructional Emphasis
1st Grade Cohort, 1994 (N=1,490)

	Writing Attitudes-Skills mn= 2.25 (.66) alpha=.86	Reading Comprehension MN=2.46(.50) alpha=.84	Application mn=1.74 (.67) alpha=.75	Communication-Integration mn=2.21 (.52) alpha=.84	Remedial-Typical mn=2.32 (.41) alpha=.73
Draw inferences	---	---	---	---	---
Use life skills mat.	---	---	0.35	---	---

Inter-Factor Correlations

	1	2	3	4	5
1-	1.0				
2-	.39	1.0			
3-	.40	.36	1.0		
4-	.49	.43	0.47	1.0	
5-	.17	.35	.08	.15	1.0

Exhibit E.3
Factor Analysis for Reading/English/Language Arts Instructional Emphasis
3rd Grade Cohort, 1994 (N=2,015)

	Writing Attitudes-Skills mn= 2.16 (.66) alpha=.90	Reading Comprehension mn=2.47 (.54) alpha=.87	Application mn=1.95 (.67) alpha=.72	Communication Integration mn=2.16 (.53) alpha=.82	Remedial-Typical mn=2.15 (.48) alpha=.77
Reading readiness	---	---	---	---	0.46
Listening	---	---	---	---	0.47
Word analysis	---	---	---	---	0.65
Vocabulary	---	---	---	---	0.46
Grammar	---	---	---	---	0.42
Spelling	---	---	---	---	0.48
Reading aloud	---	---	---	0.47	---
Identify main idea	---	0.77	---	---	---
Sequence of events	---	0.81	---	---	---
Predict events	---	0.83	---	---	---
Get author's intent	---	0.58	---	---	---
Compare readings	---	---	0.33	---	---
Integrate reading	---	---	---	0.54	---
Oral comm. skills	---	---	---	0.44	---
Persuasive writing	---	---	0.70	---	---
Narrative writing	---	---	0.47	---	---
Daily journals	---	---	---	0.44	---
Gr./voc. by writing	0.56	---	---	---	---
Writing/comp. skills	0.74	--	--	--	--
Writing process	0.65	---	---	---	---
Controlled vocab.	---	---	---	---	0.48
Write about lit.	---	---	---	0.50	---
Read novels/plays.	---	---	---	0.51	---
Read out of class	---	---	---	0.45	---
Creative projects	---	---	---	0.68	---
Int. reading/writing	---	---	---	0.70	---
Know phonetics	---	---	---	---	0.61
Follow directions	---	---	---	---	0.44
Draw inferences	---	---	---	---	---
Use life skills mat.	---	---	0.35	---	---

Exhibit E.3 (continued)
Factor Analysis for Reading/English/Language Arts Instructional Emphasis
3rd Grade Cohort, 1994 (N=2,015)

Inter-Factor Correlations

	1	2	3	4	5
1-	1.0				
2-	.39	1.0			
3-	.40	.36	1.0		
4-	.49	.43	0.47	1.0	
5-	.17	.35	.08	.15	1.0

Exhibit E.4
Factor Analysis for Math Instructional Emphasis
1st Grade Cohort, 1994 (N=1,445)

	Remedial-Typical mean= 2.28 (.56) alpha=.71	Higher-Order Thinking mean=2.67 (.39) alpha=.82	Advanced Math mean=1.11 (.50) alpha=.76
Whole numbers	---	---	---
Problem solving	---	0.48	---
Fractions/percents	---	---	0.57
Ratio/proportion	---	---	0.65
Measurement/tables	---	---	0.48
Geometry	---	---	0.57
Algebra	---	---	0.51
Trigonometry	---	---	0.44
Prob./statistics	---	---	0.52
Know concepts	---	0.52	---
Know problems	---	0.71	---
Know how to solve	---	0.92	---
Know 1+ solutions	---	0.80	---
Creative projects	---	---	---
Speed and accuracy	0.52	---	---
Use concrete object	---	---	---
Memorize facts	0.74	---	---
Understand rules	0.41	---	---
Get right answer	0.66	---	---
Application of math	---	0.44	---
Application of math	---	0.52	---

Inter-factor correlations:

	1	2	3
1-	1.0		
2-	.35	1.0	
3-	.24	0.41	1.0

Exhibit E.5
Factor Analysis for Math Instructional Emphasis
3rd Grade Cohort, 1994 (N=1,898)

	Math Attitudes mean= 2.25 (.47) alpha=.61	Higher-Order Thinking mean=2.60 (.44) alpha=.81	Remedial-Typical mean=2.28 (.46) alpha=.68	Advanced Math mean=1.59 (.53) alpha=.76
Whole numbers	---	---	0.50	---
Problem solving	---	0.41	---	---
Fractions/percents	---	---	---	0.37
Ratio/proportion	---	---	---	0.68
Measurement/tables	--	--	--	0.53
Geometry	---	---	---	0.68
Algebra	---	---	---	0.56
Trigonometry	---	---	---	0.33
Prob./statistics	---	---	---	0.62
Know concepts	---	0.53	---	---
Know problems	---	0.60	---	---
Know how to solve	--	0.91	---	---
Know 1+ solutions	--	0.84	---	---
Speed and accuracy	--	---	0.49	---
Creative projects	0.44	---	---	---
Use concrete object	0.52	---	---	---
Memorize facts	---	---	0.66	---
Understand rules	---	---	0.37	---
Get right answer	---	---	0.55	---
Confidence in math	0.38	---	---	---
Application of math	0.45	---	---	---

Inter-factor correlations:

	1	2	3	4	5
1-	1.0				
2-	0.28	1.0			
3-	0.13	0.36	1.0		
4-	0.15	0.44	0.20	1.0	

Writing Attitudes/Skills is composed of six items that a teacher might emphasize, including grammar, spelling, and developing students' confidence and appreciation for writing. *Reading Attitudes* includes three items that measure the emphasis a teacher places on the student's confidence and appreciation of reading. *Reading Comprehension* is composed of seven items that indicate the degree to which the teacher emphasizes students' comprehension of facts and details from their reading as well as their ability to draw inferences and separate fact from opinion. The *Application* composite is an indicator of the level of emphasis on functional applications, such as learning note-taking skills, study skills, or life skills. The *Communication-Integration* score indicates the emphasis on communication skills such as oral communication, reading aloud, and creative projects such as plays or skits. This factor also indicates an emphasis on integrating reading and writing projects, such as having students write about literature and integrating reading into other areas of the curriculum. The *Remedial-Typical* composite score measures the emphasis on basic reading skills, such as reading readiness, word analysis, and vocabulary, as well as listening skills and following directions.

Underlying Skills a Math Teacher Might Emphasize in Class

Our examination of the factor analyses results indicated that there are four underlying skills a math teacher might emphasize in their classes containing students in the *Prospects* sample. A brief description of each of these skills is provided below.

The *Math Attitudes* score indicates a teacher's emphasis on students developing an appreciation and confidence in their abilities to do math and to make math enjoyable and applicable to life. The *Remedial-Typical* score is an indicator of the focus on basic math skills, such as an emphasis on learning basic facts and concepts, whole numbers, fractions, and measurement. The *Advanced Math* score measures the exposure provided to more advanced math instruction such as geometry, algebra, trigonometry, or statistics. *Higher-Order Thinking* includes an emphasis on reasoning, analytic skills and problem solving.

APPENDIX F

SAMPLE SIZES FOR OUTCOMES ANALYSES

Exhibit F.1

Unweighted and Weighted Sample Sizes for Analysis of Outcomes

Cohort and Sample	Number of LEP Students, Unweighted	Number of LEP Students, Weighted	Number of EP Students, Unweighted	Number of EP Students, Weighted
1st Grade Cohort				
All Students	1,638	333,679	7,592	3,250,553
Low-Income Students	1,338	227,245	3,110	923,718
3rd Grade Cohort				
All Students	1,709	256,634	7,695	2,765,966
Low-Income Students	1,401	183,678	2,715	533,094

Exhibit F.2

CTBS and SABE Test Status for LEP and All Other Students

Cohort and Group	Took CTBS at Least Once	Took SABE at Least Once	Took Either Test at Least Once	Took Both Tests at Least Once
1st Grade Cohort				
LEP in at least 1 year (N= 1,642)	68.9%	46.8%	97.8%	18.0%
All other students (N=7,598)	98.6	0.2	98.7	0.1
3rd Grade Cohort				
LEP in at least 1 year (N=1,739)	89.7%	30.3%	98.5%	21.5%
All other students (N=7,771)	98.5	0.00	98.5	0.00

Notes: (1) Percentages are unweighted, and do not include imputed test scores.
(2) Tests were offered in: Spring 1991 (Cohort 3 only); Fall 1991 (Cohort 1 only); Spring 1992; Fall 1992 (subset of Cohort 1 only); Spring 1993; and Spring 1994.

Exhibit F.3

Number of Tests Taken for *Prospects* Study, for LEP and All Other Students

	Number of Times Took CTBS (Percentage of Students)						Number of Times Took SABE (Percentage of Students)					
Cohort and Group	0	1	2	3	4	5	0	1	2	3	4	5
1st Grade Cohort												
LEP in at least 1year (N=1,642)	31.1	10.7	15.4	16.3	23.9	2.5	53.2	9.3	11.9	9.1	14.3	2.3
All other students (N=7,598)	1.4	3.1	7.0	18.3	57.2	13.1	99.8	0.6	0.0	0.0	0.0	0.0
3rd Grade Cohort												
LEP in at least 1 year (N=1,739)	10.4	13.6	16.6	23.1	36.4	--	69.8	12.5	8.7	5.9	3.1	--
All other students (N=7,771)	1.5	3.6	8.9	23.9	62.2	--	100.0	0.0	0.0	0.0	0.0	--

Notes: (1) Percentages are unweighted, and do not include imputed test scores.
(2) Tests were offered in: Spring 1991 (Cohort 3 only); Fall 1991 (Cohort 1 only); Spring 1992; Fall 1992 (subset of Cohort 1 only); Spring 1993; and Spring 1994.

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Appendix F.4

CTBS and SABE Test Status for LEP Exiters, LEP Non-Exiters, and EP Students

Cohort and Group	Took CTBS at Least Once	Took SABE at Least Once	Took Either Test at Least Once	Took Both Tests at Least Once
1st Grade Cohort				
LEP in Grades 1 to 3	53.6%	54.8%	94.9%	13.4%
LEP in Grades 1 and 2 Only	99.0	9.0	99.0	9.0
LEP in Grade 1 Only	94.9	2.2	94.9	2.2
Never LEP	96.1	0.0	96.1	0.0
3rd Grade Cohort				
LEP in Grades 3 to 6	80.5%	56.4%	98.2%	38.6%
LEP in Grades 3 to 5 Only	96.5	28.6	99.5	25.3
LEP in Grades 3 and 4 Only	97.4	4.0	97.4	4.0
LEP in Grade 3 Only	100.0	3.1	100.0	3.1
Never LEP	98.5	0.0	98.5	0.0

Notes: (1) Percentages are unweighted and do not include imputed test scores.

(2) Tests were offered in: Spring 1991 (3rd Grade Cohort only); Fall 1991 (1st Grade Cohort only); Spring 1992; Fall 1992 (subsample of Cohort 1 only); Spring 1993; and Spring 1994.

(3) Note: The grade level listed in the first column assumes that all students in the cohort progress one grade level each year. Thus, students that were retained or accelerated during the *Prospects* are included in the estimates with the rest of their cohort, even though they may not be in the grade level indicated.

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APPENDIX G

STRUCTURE OF HLM ANALYSIS FOR ACHIEVEMENT TEST SCORES

STRUCTURE OF HLM ANALYSIS FOR ACHIEVEMENT TEST SCORES

This appendix briefly describes the specification of the models used to analyze achievement test scores. A detailed discussion of the use of hierarchical linear modeling to analyze test scores for the *Prospects* student sample can be found in Puma, et al. (1996).

Over the three years that outcomes were measured for students in the 1st grade cohort there are eight possible patterns of LEP status. The definitions of LEP status pattern categories are given in Chapter 4. The pattern categories for 1st grade cohort students include 'never LEP' (LEP000) and seven patterns for LEP students (LEP100, LEP010, LEP001, LEP110, LEP101, LEP011, LEP111). In the 3rd grade cohort there were 15 LEP patterns, and one non-LEP pattern, for the four years observed. The definitions of the patterns for 3rd grade cohort students are analogous to those for the 1st grade cohort students (e.g., LEP0000, LEP1000). The goal of the LEP status pattern analysis was to compare the average test score growth of students across the patterns of LEP status. Models were of the form:

$$\begin{aligned} Y_{ijk} = \quad & \mathrm{b}_0 + \mathrm{b}_1(\mathrm{GRADE}_i) + \Sigma\, \mathrm{b}_{m+1}(\mathrm{Pattern}_j) + \Sigma\, \mathrm{b}_{m+p+1}(\mathrm{GRADE}_i)(\mathrm{Pattern}_j) + \\ & \mathrm{n}_{0k'} + \mathrm{n}_{1k'}(\mathrm{GRADE}_i) + u_{oj} + u_{1j}(\mathrm{GRADE}_i) + \mathrm{e}_{ijk}, \end{aligned}$$

where:

Y_{ijk} is the outcome measure (transformed 1st grade cohort CTBS—or converted SABE—scores) at grade i for student j in school k;

b's are fixed effects coefficients;

GRADE is coded as a separate (0,1) indicator variable for each grade (excluding the earliest grade for each cohort);

Σ's represent summation over $m = 1...7$ (1...15, for the 3rd grade cohort);

PATTERN is a (0,1) indicator variable indicating whether or not the j^{th} student is a member of the group classified by the m^{th} pattern (pattern 000 is taken as the baseline and compared to the remaining patterns);

n's represent random effects coefficients for the third level (schools);

u's represent random coefficients for the second level (students); and

e_{ijk} represents the random error at the first student level.

APPENDIX H

PARAMETER ESTIMATES FOR HLM ANALYSIS OF MATH TEST SCORES

Exhibit H.1
First Grade Cohort Math Computations Parameter Estimates

Fixed effects

Model for intercept (initial status)	Estimate	se	z	p
BASE(LEP000)	223.300	4.429	50.4177	***
LEP100	35.760	13.600	2.6294	**
LEP010	-16.610	17.880	-0.9290	NS
LEP001	-23.570	18.020	-1.3080	NS
LEP110	23.730	12.050	1.9693	*
LEP011	5.423	24.420	0.2221	NS
LEP101	-12.500	28.900	-0.4325	NS
LEP111	-10.130	6.307	-1.6062	NS
Model for slope (growth rate)				
Grade Slope(LEP000)	247.200	2.574	96.0373	***
Grade*LEP100	-14.530	8.335	-1.7433	NS
Grade*LEP010	11.380	10.980	1.0364	NS
Grade*LEP001	0.788	11.150	0.0707	NS
Grade*LEP110	-10.100	7.401	-1.3647	NS
Grade*LEP011	-1.881	14.980	-0.1256	NS
Grade*LEP101	0.771	17.780	0.0434	NS
Grade*LEP111	-2.283	3.864	-0.5908	NS

Random Effects

Level 3	Estimate	se	z	p
random intercept $n_{0k'}$	3136	369.9	8.48	***
cov($n_{0k'}$,$n_{1k'}$)	-1652	206.1	8.02	***
random slope $n_{1k'}$	1031	124.2	8.30	***

Level 2	Estimate	se	z	p
random intercept u_{0j}	6274	369.9	16.96	***
cov(u_{0j},u_{1j})	-1783	249.3	7.15	***
random slope u_{1j}	384.5	167.4	2.30	**

Level 1	Estimate	se	z	p
random error e_{0i}	2105	30.52	68.97	***

*** p<.001; ** p<.01; * p<.05

Exhibit H.2
Third Grade Cohort Math Computations Parameter Estimates

Fixed effects				
Model for intercept (initial status)	Estimate	se	z	p
BASE(LEP0000)	665.100	1.380	481.957	***
LEP1000	-0.005	3.764	-0.001	NS
LEP0100	-3.459	4.390	-0.788	NS
LEP0010	-1.394	6.461	-0.216	NS
LEP0001	-14.770	4.135	-3.572	***
LEP1100	-1.668	3.804	-0.438	NS
LEP0110	7.058	8.846	0.798	NS
LEP0011	-11.740	6.885	-1.705	NS
LEP0101	-12.920	10.270	-1.258	NS
LEP1010	12.990	7.621	1.705	NS
LEP1001	3.508	8.995	0.390	NS
LEP1110	-9.716	3.172	-3.063	**
LEP0111	-11.020	7.112	-1.549	NS
LEP1011	-3.775	7.518	-0.502	NS
LEP1101	-20.450	8.689	-2.354	*
LEP1111	-23.860	1.937	-12.318	***
Model for slope (growth rate)				
Grade Slope(LEP0000)	22.0100	0.4199	52.4172	***
Grade*LEP1000	-0.3503	1.3070	-0.2680	NS
Grade*LEP0100	0.8477	1.5260	0.5555	NS
Grade*LEP0010	-0.5374	2.2510	-0.2387	NS
Grade*LEP0001	2.1720	1.4660	1.4816	NS
Grade*LEP1100	1.1820	1.3350	0.8854	NS
Grade*LEP0110	0.2112	3.0640	0.0689	NS
Grade*LEP0011	-3.5940	2.4120	-1.4900	NS
Grade*LEP0101	2.0680	3.6100	0.5729	NS
Grade*LEP1010	-0.9272	2.6540	-0.3494	NS
Grade*LEP1001	-3.8580	3.1170	-1.2377	NS
Grade*LEP1110	3.4800	1.1050	3.1493	**
Grade*LEP0111	-2.5980	2.4760	-1.0493	NS
Grade*LEP1011	2.4290	2.6230	0.9260	NS
Grade*LEP1101	1.5210	3.0420	0.5000	NS
Grade*LEP1111	4.6610	0.6691	6.9661	***

Exhibit H.2
Third Grade Cohort Math Computations Parameter Estimates
(continued)

Random Effects

Level 3	Estimate	se	z	p
random intercept $n_{0k'}$	316.9	36.35	8.72	***
cov($n_{0k'}$,$n_{1k'}$)	-36.02	8.363	4.31	***
random slope $n_{1k'}$	27.83	3.329	8.36	***

Level 2	Estimate	se	z	p
random intercept u_{0j}	1143	24.6	46.46	***
cov(u_{0j},u_{1j})	-57.96	6.919	8.38	***
random slope u_{1j}	55.752	3.266	17.07	***

Level 1	Estimate	se	z	p
random error e_{0i}	704.3	7.252	97.12	***

*** $p<.001$; ** $p<.01$; * $p<.05$

Exhibit H.3
First Grade Cohort Math Applications Parameter Estimates

Fixed effects				
Model for intercept (initial status)	Estimate	se	z	p
BASE(LEP000)	107.000	3.439	31.1137	***
LEP100	18.170	11.980	1.5167	NS
LEP010	-10.590	15.740	-0.6728	NS
LEP001	-35.280	15.930	-2.2147	*
LEP110	-11.840	10.580	-1.1191	NS
LEP011	-19.750	21.530	-0.9173	NS
LEP101	-43.620	25.530	-1.7086	NS
LEP111	-44.430	5.476	-8.1136	***
Model for slope (growth rate)				
Grade Slope(LEP000)	198.800	2.221	89.5092	***
Grade*LEP100	-1.260	7.871	-0.1601	NS
Grade*LEP010	4.986	10.350	0.4817	NS
Grade*LEP001	-0.133	10.570	-0.0126	NS
Grade*LEP110	6.298	6.972	0.9033	NS
Grade*LEP011	10.480	14.130	0.7417	NS
Grade*LEP101	6.697	16.820	0.3982	NS
Grade*LEP111	5.100	3.607	1.4139	NS
Random Effects				
Level 3	Estimate	se	z	p
random intercept $n_{0k'}$	1773	220.1		
$\mathrm{cov}(n_{0k'}, n_{1k'})$	-777.2	123.5		
random slope $n_{1k'}$	729.6	91.55		
Level 2	Estimate	se	z	p
random intercept u_{0j}	3670	321		
$\mathrm{cov}(u_{0j}, u_{1j})$	-400.9	207.4		
random slope u_{1j}	613	147.9		
Level 1	Estimate	se	z	p
random error e_{0i}	1802	26.25		

*** p<.001; ** p<.01; * p<.05

Exhibit H.4
Third Grade Cohort Math Applications Parameter Estimates

Fixed effects Model for intercept (initial status)	Estimate	se	z	p
BASE(LEP0000)	671.100	1.768	379.581	***
LEP1000	-11.490	4.486	-2.561	*
LEP0100	-10.030	5.235	-1.916	NS
LEP0010	-7.896	7.699	-1.026	NS
LEP0001	-29.460	4.930	-5.976	***
LEP1100	-14.540	4.539	-3.203	**
LEP0110	-14.010	10.540	-1.329	NS
LEP0011	-28.350	8.213	-3.452	***
LEP0101	-18.530	12.250	-1.513	NS
LEP1010	-0.594	9.089	-0.065	NS
LEP1001	-15.350	10.710	-1.433	NS
LEP1110	-24.630	3.784	-6.509	***
LEP0111	-38.510	8.478	-4.542	***
LEP1011	-19.730	8.959	-2.202	*
LEP1101	-32.060	10.350	-3.098	**
LEP1111	-37.910	2.317	-16.362	***
Model for slope (growth rate)				
Grade Slope(LEP0000)	17.4500	0.3647	47.8475	***
Grade*LEP1000	2.2600	1.1890	1.9008	NS
Grade*LEP0100	1.4450	1.3880	1.0411	NS
Grade*LEP0010	-0.7141	2.0490	-0.3485	NS
Grade*LEP0001	4.5290	1.3370	3.3874	***
Grade*LEP1100	4.6730	1.2140	3.8493	***
Grade*LEP0110	5.2540	2.7870	1.8852	NS
Grade*LEP0011	0.7963	2.1970	0.3624	NS
Grade*LEP0101	5.9990	3.2900	1.8234	NS
Grade*LEP1010	2.1420	2.4130	0.8877	NS
Grade*LEP1001	3.3390	2.8350	1.1778	NS
Grade*LEP1110	4.6220	1.0050	4.5990	***
Grade*LEP0111	6.2380	2.2530	2.7688	**
Grade*LEP1011	5.2820	2.3890	2.2110	*
Grade*LEP1101	3.5550	2.7700	1.2834	NS
Grade*LEP1111	5.3060	0.6066	8.7471	***

Exhibit H.4
Third Grade Cohort Math Applications Parameter Estimates
(continued)

Random Effects

Level 3	Estimate	se	z	p
random intercept $n_{0k'}$	532.6	60.01	8.88	***
$\mathrm{cov}(n_{0k'}, n_{1k'})$	-37.3	9.20	-4.05	***
random slope $n_{1k'}$	20.52	2.49	8.24	***
Level 2	**Estimate**	**se**	**z**	**p**
random intercept u_{0j}	1809	34.54	52.37	***
$\mathrm{cov}(u_{0j}, u_{1j})$	-44.94	7.358	6.11	***
random slope u_{1j}	16.79	2.855	5.88	***
Level 1	**Estimate**	**se**	**z**	**p**
random error e_{0i}	730.2	7.516	97.15	***

*** p<.001; ** p<.01; * p<.05

Exhibit H.5
First Grade Cohort Low Income Sample Math Computations Parameter Estimates

Fixed effects

Model for intercept (initial status)	Estimate	se	z	p
BASE(LEP000)	200.000	5.298	37.7501	***
LEP100	50.120	18.210	2.7523	**
LEP010	-9.084	23.760	-0.3823	NS
LEP001	-26.470	22.640	-1.1692	NS
LEP110	41.630	14.900	2.7940	**
LEP011	7.402	27.390	0.2702	NS
LEP101	-4.162	34.370	-0.1211	NS
LEP111	6.448	7.458	0.8646	NS

Model for slope (growth rate)				
Grade Slope(LEP000)	252.200	3.175	79.4331	***
Grade*LEP100	-16.190	11.220	-1.4430	NS
Grade*LEP010	10.650	14.660	0.7265	NS
Grade*LEP001	5.016	14.070	0.3565	NS
Grade*LEP110	-15.350	9.175	-1.6730	NS
Grade*LEP011	-2.611	16.850	-0.1550	NS
Grade*LEP101	-1.814	21.230	-0.0854	NS
Grade*LEP111	-7.075	4.580	-1.5448	NS

Random Effects

Level 3	Estimate	se	z	p
random intercept $n_{0k\cdot}$	2284	386.3	5.91	***
cov($n_{0k\cdot}$,$n_{1k\cdot}$)	-1241	222.1	5.59	***
random slope $n_{1k\cdot}$	791.8	137.3	5.77	***

Level 2	Estimate	se	z	p
random intercept u_{0j}	7232	618.4	11.69	***
cov(u_{0j},u_{1j})	-2302	390.3	5.90	***
random slope u_{1j}	657	261.9	2.51	**

Level 1	Estimate	se	z	p
random error e_{0i}	2245	46.66	48.11	***

*** $p<.001$; ** $p<.01$; * $p<.05$

Exhibit H.6
Third Grade Cohort Low Income Math Computations Parameter Estimates

Fixed effects Model for intercept (initial status)	Estimate	se	z	p
BASE(LEP0000)	655.600	1.734	378.085	***
LEP1000	3.321	4.715	0.704	NS
LEP0100	-0.303	5.414	-0.056	NS
LEP0010	0.925	7.789	0.119	NS
LEP0001	-7.976	4.907	-1.625	NS
LEP1100	2.802	4.510	0.621	NS
LEP0110	22.630	12.750	1.775	NS
LEP0011	-16.630	8.313	-2.000	*
LEP0101	-10.160	11.680	-0.870	NS
LEP1010	17.020	9.334	1.823	NS
LEP1001	12.310	11.320	1.087	NS
LEP1110	-6.054	3.677	-1.646	NS
LEP0111	-6.999	8.150	-0.859	NS
LEP1011	7.273	8.657	0.840	NS
LEP1101	-13.420	9.430	-1.423	NS
LEP1111	-19.080	2.235	-8.537	***
Model for slope (growth rate)				
Grade Slope(LEP0000)	21.8700	0.5789	37.7785	***
Grade*LEP1000	-2.2360	1.5960	-1.4010	NS
Grade*LEP0100	-0.0852	1.8450	-0.0462	NS
Grade*LEP0010	-0.0858	2.6560	-0.0323	NS
Grade*LEP0001	1.7070	1.7070	1.0000	NS
Grade*LEP1100	1.0410	1.5510	0.6712	NS
Grade*LEP0110	-4.3160	4.3170	-0.9998	NS
Grade*LEP0011	-2.7670	2.8360	-0.9757	NS
Grade*LEP0101	0.0436	4.0220	0.0108	NS
Grade*LEP1010	-4.4950	3.1830	-1.4122	NS
Grade*LEP1001	-6.7770	3.8320	-1.7685	NS
Grade*LEP1110	3.2820	1.2540	2.6172	**
Grade*LEP0111	-2.5730	2.7780	-0.9262	NS
Grade*LEP1011	-0.9371	2.9310	-0.3197	NS
Grade*LEP1101	-0.7533	3.2300	-0.2332	NS
Grade*LEP1111	4.5680	0.7599	6.0113	***

Exhibit H.6
Third Grade Cohort Low Income Math Computations Parameter Estimates
(continued)

Random Effects

Level 3	Estimate	se	z	p
random intercept $n_{0k'}$	258.8	41.87	6.18	***
$\mathrm{cov}(n_{0k'}, n_{1k'})$	-51.11	11.43	4.47	***
random slope $n_{1k'}$	28.37	4.645	6.11	***

Level 2	Estimate	se	z	p
random intercept u_{0j}	1207	38.79	31.12	***
$\mathrm{cov}(u_{0j}, u_{1j})$	-96.12	10.94	8.79	***
random slope u_{1j}	53.1	4.962	10.70	***

Level 1	Estimate	se	z	p
random error e_{0i}	711.5	11.06	64.33	***

*** $p<.001$; ** $p<.01$; * $p<.05$

Exhibit H.7
First Grade Cohort Low Income Sample Math Applications Parameter Estimates

Fixed effects

Model for intercept (initial status)	Estimate	se	z	p
BASE(LEP000)	89.370	4.362	20.4883	***
LEP100	31.730	15.160	2.0930	*
LEP010	2.334	19.790	0.1179	NS
LEP001	-43.720	18.910	-2.3120	*
LEP110	1.208	12.410	0.0973	NS
LEP011	-12.550	22.800	-0.5504	NS
LEP101	-33.020	28.640	-1.1529	NS
LEP111	-35.110	6.202	-5.6611	***
Model for slope (growth rate)				
Grade Slope(LEP000)	191.700	2.755	69.5826	***
Grade*LEP100	-2.225	9.703	-0.2293	NS
Grade*LEP010	-3.102	12.690	-0.2444	NS
Grade*LEP001	9.126	12.210	0.7474	NS
Grade*LEP110	9.418	7.943	1.1857	NS
Grade*LEP011	7.112	14.540	0.4891	NS
Grade*LEP101	4.822	18.370	0.2625	NS
Grade*LEP111	9.205	3.966	2.3210	*

Random Effects

Level 3	Estimate	se	z	p
random intercept $n_{0k'}$	1527	260.3	5.87	***
cov($n_{0k'}$,$n_{1k'}$)	-790	151.5	-5.21	***
random slope $n_{1k'}$	597	103.4	5.77	***

Level 2	Estimate	se	z	p
random intercept u_{0j}	3171	81.63	38.85	***
cov(u_{0j},u_{1j})				
random slope u_{1j}				

Level 1	Estimate	se	z	p
random error e_{0i}	1799	27.16	66.24	***

*** p<.001; ** p<.01; * p<.05

Exhibit H.8
Third Grade Cohort Math Computations Parameter Estimates

Fixed effects Model for intercept (initial status)	Estimate	se	z	p
BASE(LEP0000)	651.000	1.726	377.173	***
LEP1000	-5.182	5.010	-1.034	NS
LEP0100	-4.069	5.752	-0.707	NS
LEP0010	-0.202	8.280	-0.024	NS
LEP0001	-18.560	5.212	-3.561	***
LEP1100	-3.156	4.784	-0.660	NS
LEP0110	-5.112	13.560	-0.377	NS
LEP0011	-28.900	8.840	-3.269	**
LEP0101	-16.740	12.430	-1.347	NS
LEP1010	7.018	9.923	0.707	NS
LEP1001	-14.930	12.040	-1.240	NS
LEP1110	-14.940	3.900	-3.831	***
LEP0111	-33.050	8.661	-3.816	***
LEP1011	-6.367	9.207	-0.692	NS
LEP1101	-14.000	10.020	-1.397	NS
LEP1111	-27.060	2.358	-11.476	***
Model for slope (growth rate)				
Grade Slope(LEP0000)	18.7900	0.4745	39.5996	***
Grade*LEP1000	0.9258	1.4060	0.6585	NS
Grade*LEP0100	0.8154	1.6280	0.5009	NS
Grade*LEP0010	-1.8410	2.3450	-0.7851	NS
Grade*LEP0001	3.7870	1.5120	2.5046	*
Grade*LEP1100	2.6890	1.3690	1.9642	*
Grade*LEP0110	3.3940	3.8080	0.8913	NS
Grade*LEP0011	0.8299	2.5030	1.3316	NS
Grade*LEP0101	5.6060	3.5620	1.5738	NS
Grade*LEP1010	-1.7260	2.8050	-0.6153	NS
Grade*LEP1001	4.2430	3.3810	1.2550	NS
Grade*LEP1110	3.9670	1.1050	3.5900	***
Grade*LEP0111	6.6460	2.4520	2.7104	**
Grade*LEP1011	2.6320	2.5850	1.0182	NS
Grade*LEP1101	1.2820	2.8520	0.4495	NS
Grade*LEP1111	4.4940	0.6649	6.7589	***

Exhibit H.8
Third Grade Cohort Math Computations Parameter Estimates
(continued)

Random Effects

Level 3	Estimate	se	z	p
random intercept $n_{0k\cdot}$	243.1	40.72	5.97	***
cov($n_{0k\cdot}$,$n_{1k\cdot}$)	-23.87	8.407	2.88	***
random slope $n_{1k\cdot}$	17.85	3.045	5.86	***

Level 2	Estimate	se	z	p
random intercept u_{0j}	1399	35.63	39.26	***
cov(u_{0j},u_{1j})	0	0	0	NS
random slope u_{1j}	0	0	0	NS

Level 1	Estimate	se	z	p
random error e_{0i}	761.9	9.744	78.19	***

*** p<.001; ** p<.01; * p<.05

APPENDIX I

TEACHER JUDGEMENTS AS MEASURES OF STUDENTS' ENGLISH PROFICIENCY

TEACHER JUDGEMENTS AS MEASURES OF STUDENTS' ENGLISH PROFICIENCY

This appendix examines in detail the reliability and validity of teachers' judgements of students' English proficiency. These proficiency measures are used in Chapter 2 to characterize the English language skills of LEP students, in Chapter 3 to show which students receive language-related services, and in Chapter 4 to show which students exit LEP status during the study period. The proficiency measures are an integral part of this study, and for this and two other reasons deserve close scrutiny. First, teacher judgements are *subjective*, and therefore potentially more difficult to interpret than a more objective measure, such as a score from a standardized test of English proficiency. Research on survey instrument design shows that responses to judgmental questions are sensitive to question wording and to the broader questionnaire.[1] Second, missing proficiency measures were subject to a two-step imputation process, and it is important to understand how the imputations affected the distributions of the proficiency variables.

This appendix addresses the following specific questions:

- How were the English proficiency variables *constructed*, what imputations were done, and how did the imputations affect the values of the variables?
- How *reliable* are teacher judgements, in the following sense: how well do assessments in a given year predict assessments in subsequent years?
- How *valid* are teacher judgements, in the following sense: to what extent are the proficiency variables related to other variables that we expect to be correlated with students' English proficiency? Examples of such variables are: standardized reading test scores; receipt of language-related services; parents' self-reported English proficiency; parents' reports of how often English is used in the home; and exits from LEP status.

Each of these questions is addressed below. Based on these analyses, we believe the proficiency variables are sufficiently reliable and valid for the purposes of this study.

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[1] In addition, it is possible that measurement error in teacher judgements of language proficiency may be related to the level of proficiency. For example, it may be more difficult to assess language proficiency when students are in the middle of the proficiency spectrum.

How Were the English Proficiency Measures Constructed?

Data on each LEP student's English proficiency were collected through the "student profile" instrument, which was to be answered by the teacher who knew the student best. The instrument used a two-step process. First, respondents were asked whether the student was language-minority (LM) or limited English proficient, according to definitions provided in the instrument. *If* the teacher answered that the student was LM or LEP, then he or she was asked:

> *How would you characterize this student's proficiency in English? Circle one response for each language skill for each language minority or limited-English-proficient student.*
>
> *a.* *Speaking*
> *Excellent*
> *Good*
> *Fair*
> *Poor*
> *No proficiency*
> *b.* *Understanding*
> *(Same response categories)*
> *c.* *Reading*
> *(Same response categories)*
> *d.* *Writing*
> *(Same response categories)*

This question was asked in each year of the study, so a student who was considered LM or LEP in every year could have three or four years of English proficiency rating data (generally from different teachers), depending on whether the student was in the 1st or 3rd grade cohort.[2] The question would be legitimately skipped in any year in which a teacher considered a student *not* to be LM or LEP.

Missing values for the English proficiency variables were then imputed. The relevant sample for the imputations (and for all analyses of English proficiency in this report) is the subset of students who we identify as LEP in at least one year of the study. (The remaining sample members were considered English proficient in every year of the study, and no analyses of English proficiency were performed for these students.) First, we did a *logical* imputation: if an English proficiency variable was missing in any year *because it was legitimately skipped* (i.e., because the teacher did not consider the student to be LM or LEP in that year), the value of the variable was recoded to "excellent" English proficiency. Second, for values of the English proficiency variables that were missing for other reasons, multivariate maximum-likelihood imputations were performed, as described in Appendix D.

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[2] The instrument did not provide detailed instructions on how to rate proficiency in each domain (speaking, understanding, reading, and writing).

Across all years, 14 percent of the English proficiency values in the 1st grade cohort, and 21 percent of the English proficiency values in the 3rd grade cohort, were legitimate skips and therefore logically imputed. Apart from the legitimate skips, the average missing rate for the English proficiency variables was 19 percent for the 1st grade cohort, and 23 percent for the 3rd grade cohort. This is the percentage of observations imputed using the maximum-likelihood method described in Appendix D.

The effect of the first imputation step, to recode legitimate skips as "excellent" English proficiency, is to greatly increase the percentage of LEP students with excellent English proficiency. Exhibit I.1 shows how the percentage of students judged to have excellent proficiency in the first year observed increases with the two imputation steps. It is *possible* that the logical imputation step overstates the percentage of LEP students judged to have excellent English proficiency. For example, if a respondent did not read the definition of "limited English proficiency" carefully and incorrectly said a student was not LEP, that would create an inappropriate legitimate skip and a potentially inaccurate logical imputation of excellent English proficiency. There is no clear way to determine how often respondents incorrectly coded LEP students as not LEP. On the other hand, the percentage of LEP students with excellent English proficiency in the first column of Exhibit I.1 is clearly too low, because some large portion of legitimate skips are very likely to be correct.

One way to explore this issue further is to compare the characteristics of LEP students who were logically imputed to have excellent English proficiency to the characteristics of LEP students whose English proficiency was not imputed. We examined a number of LEP students' characteristics that are correlated in the *Prospects* data with English proficiency: CTBS test scores; whether English is the parents' native language; how frequently English is spoken in the home (according to parents); and whether students are low-income. Briefly, the LEP students who were logically imputed to have excellent English proficiency looked more like the non-imputed LEP students with excellent English proficiency than like the non-imputed LEP students with lower levels of English proficiency.[3] For this reason, we believe the logical imputations of English proficiency were appropriate both in principle and in practice.

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[3] For example, compared to LEP students with non-imputed excellent proficiency, LEP students whose English proficiency was imputed to be excellent were more likely: to have a parent whose native language was English; to speak English at home; and *not* to be low-income. The data on CTBS test scores is more difficult to summarize but, in broad terms, students whose proficiency was *imputed* to be excellent had test scores that on average fell between students with non-imputed excellent proficiency and students with non-imputed good proficiency.

Exhibit I.1

The Effect of Imputation on Teacher Assessments of English Language Proficiency

	Percent of Students Whose Proficiency is Judged to Be Excellent:		
Cohort and Language Skill	Before Imputation	After Logical Imputation	After Maximum Likelihood Imputation
1st Grade Cohort			
Understanding	10.3%	30.9%	33.9%
Speaking	6.8	27.5	29 .5
Reading	5.4	26.1	28.6
Writing	4.6	25.3	27.3
3rd Grade Cohort			
Understanding	13.3%	33.3%	37.9%
Speaking	8.5	28.5	33.0
Reading	7.2	27.2	29.7
Writing	4.7	24.7	26.4

Notes: Data are for 1st grade (1992) for the 1st grade cohort and 3rd grade (1991) for the 3rd grade cohort.

How Reliable Are Teacher Judgements of Students' English Proficiency?

One measure of the reliability of teacher judgements of English proficiency is the extent to which an assessment in a year can be predicted from an assessment in a prior year. (Another measure is cross-rater reliability, but we cannot examine this because in any given year only one teacher assesses each student's English proficiency.) This measure is important because generally we expect English proficiency to be strongly correlated across years within students, and to grow over time. If the data did not show these patterns, the reliability of teacher judgements would be called into question. Because students usually change primary teachers each year, the more subjective and idiosyncratic are teacher judgements, the lower should be the correlation across years within students and the weaker the growth in proficiency over time.

Although we expect to see strong correlations in the proficiency measures over time, we do not expect that a prior year's proficiency would *perfectly* predict subsequent proficiency, even if there were no measurement error. This is because students' proficiencies grow at different rates. Student A may jump two levels in a year, while student B may jump only one level, and student C may stay at the same proficiency level. Therefore the predictive power in the data will be a function of both true variation in growth rates and measurement error; the greater either of these factors, the lower the predictive power of a prior year's proficiency level.

Exhibit I.2 shows the results of univariate regressions of English proficiency on prior years' proficiency, for the domains of speaking and reading English. Two numbers are reported for each regression: beta, which is the regression coefficient showing the change in the expected value of proficiency in a given year for a one-unit change in proficiency in a prior year (i.e., a measure of the average growth in proficiency across years); and R^2, which measures the proportion of the variance in proficiency explained by prior years' proficiency.[4] As an example of how to read the table, the top row of the table and the third and fourth columns show the results of regressing English speaking proficiency as measured in 1993 on English speaking proficiency as measured in 1992, for the 1st grade cohort. The beta of 0.50 indicates a fairly strong predictive power of the prior year's proficiency, and the R^2 of 0.33 means that the prior year's proficiency explains one-third of the variation across LEP students in the subsequent year's proficiency.

In general, the exhibit suggests a fair degree of reliability for teacher judgements of English proficiency. The slopes in adjacent years are around 0.5, indicating a positive growth rate and a reasonably strong relationship across years. As expected, the slopes are always greater in adjacent years than for periods two or three years apart, which suggests a stable relationship over time. The

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[4] In a univariate regression, R^2 is also the square of the simple correlation between the dependent and independent variables. For example, an R^2 of 0.33 implies a simple correlation of 0.57.

Exhibit I.2

Predictive Power of Prior Years' Values of Teacher Assessed English Language Proficiency

	β and R² for English Speaking Proficiency in:						β and R² for English Reading Proficiency in:					
	1992		1993		1994		1992		1993		1994	
Cohort and Group	β	R²	β	R²	β	R²	β	R²	β	R²	β	R²
1st Grade Cohort												
1992	---	---	.50	.33	.42	.23	---	---	.74	.60	.49	.35
1993	---	---	---	---	.53	.28	---	---	---	---	.57	.42
3rd Grade Cohort												
1991	.52	.35	.39	.26	.25	.11	.53	.36	.45	.31	.29	.13
1992	---	---	.48	.30	.29	.11	---	---	.50	.30	.34	.15
1993	---	---	---	---	.43	.19	---	---	---	.---	.47	.23

R^2s in adjacent years average about .33, implying that a fair portion of the variance across students in English proficiency is explained by proficiency in the prior year. Overall, the positive slopes, the reasonable relationship across adjacent years, and the consistency of the patterns suggests that teacher judgements of English proficiency have a fair degree of reliability.

How Valid Are Teacher Judgements of English Proficiency?

If teacher judgements are good measures of students' English proficiency, then we expect them to be correlated with other variables that themselves may be related to English proficiency. To that end, we examined the relationship between the teacher judgements and: standardized reading test scores; receipt of language-related services; parents' self-reported English proficiency; parents' reports of how often English is used in the home; and exits from LEP status.

English proficiency and reading test scores. In general we expect a positive relationship between English proficiency and CTBS reading test scores: LEP students with higher levels of English proficiency should score higher on the CTBS reading test. This is a broad generalization, however, with an important caveat. The CTBS reading test is not designed to measure English proficiency for non-native English speakers; it is designed to measure cognitive reading skills. Given this, it is not clear that we should expect more than a weak relationship between English proficiency and test scores.

Exhibit I.3 presents "box and whiskers" graphs of CTBS Reading Vocabulary test scores for each level of assessed English proficiency, for the 1st grade cohort. Exhibit I.4 presents the analogous graphs for the 3rd grade cohort. The top two graphs in each exhibit use data for year 2, with the top left graph showing English speaking proficiency and the top right graph showing English reading proficiency. The two bottom graphs in each exhibit are analogous, and pertain to year 4. The line in the middle of each box represents the median test score, and the box itself extends from the 25th to 75th percentile. The data in these graphs include imputed proficiency and test score data.

Both exhibits show evidence of a weak positive relationship between assessed English proficiency and test scores. In each graph the median test score tends to increase with proficiency, although not by much. The pattern is very similar across cohorts, across years, and across proficiency domains.

Receipt of language-related services. In general we expect that students with more limited English proficiency are more likely to receive language-related services. This relationship is explored in Chapter 3; see Exhibits 3.12 and 3.16 and the accompanying discussion. Exhibit 3.12 shows a strong relationship between the percent of LEP students receiving ESL or bilingual instruction and teachers' ratings of students English proficiency in the previous year. Exhibit 3.16

Exhibit I.3

CTBS Reading Vocabulary Scores by English Proficiency: 1st Grade Cohort

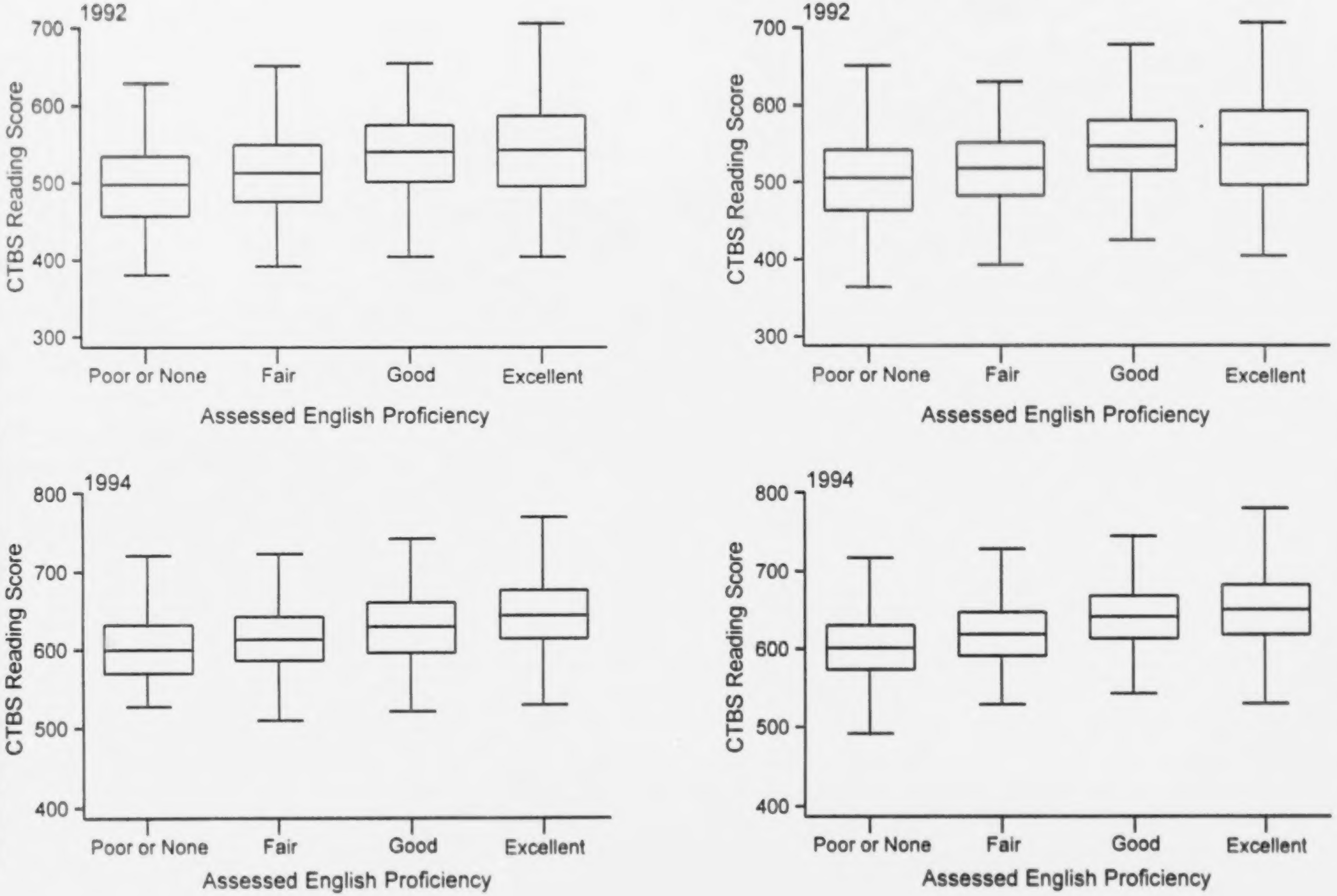
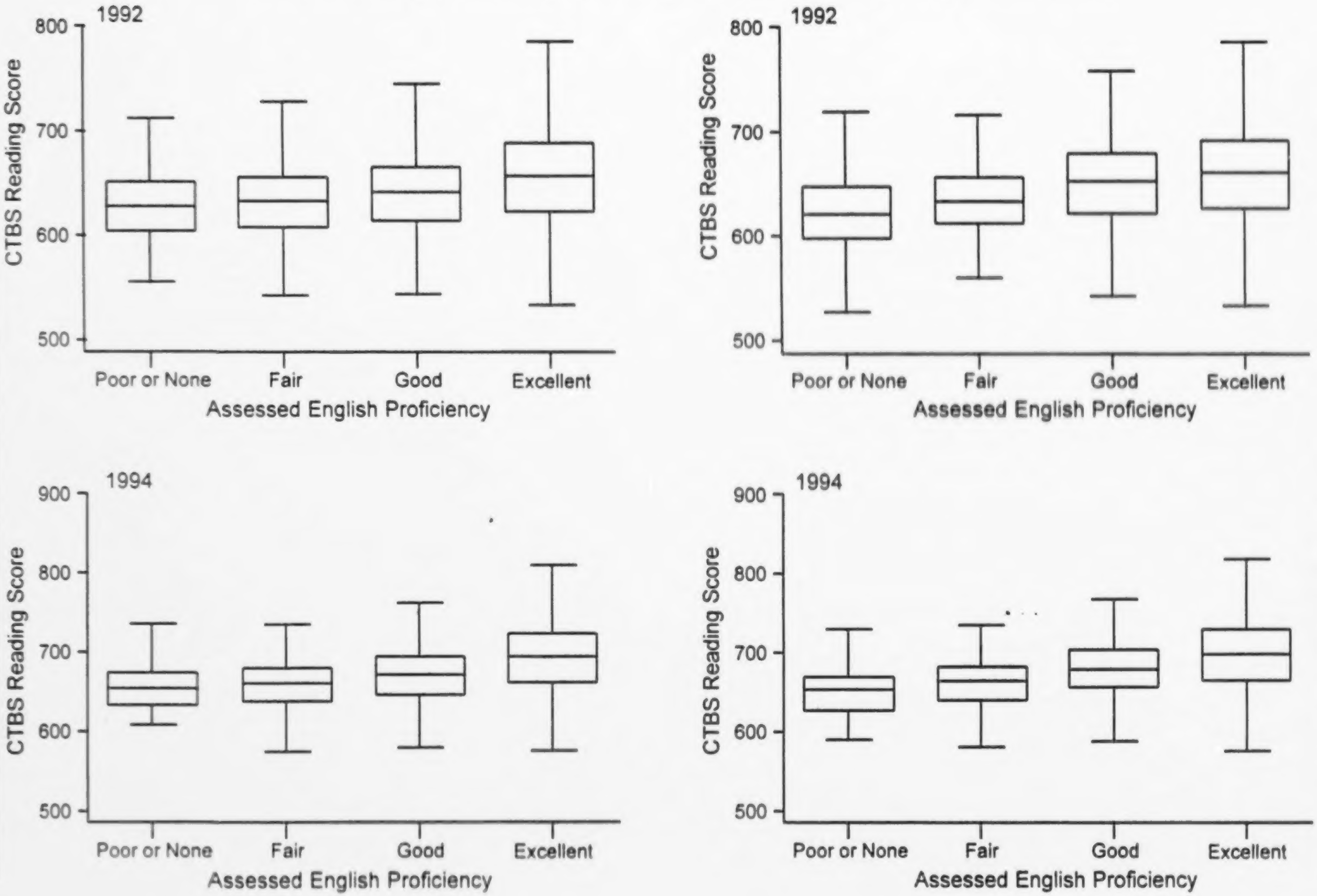


Exhibit I.4

CTBS Reading Vocabulary Scores by English Proficiency: 3rd Grade Cohort



shows a similarly strong relationship between prior year proficiency ratings and the percentage of instruction in a language other than English.

Parents' English proficiency and use of English in the home. In general we expect that parents' and students' English proficiency to be positively related: the higher a parent's proficiency, the higher their children's proficiency, on average.[5] (Parents' English proficiency is self-reported.) Exhibit 2.14 in Chapter 2 documents a strong relationship between parents' and students' proficiencies, as expected. There is a similarly strong relationship between teacher assessments of students' English proficiency and parents' reports of how often English is spoken in the home; these results are not shown.

Exit from LEP status. Last but quite important, we expect that students who exit LEP status in any given year will have higher levels of English proficiency than students who do not exit LEP status. As with the other variables discussed in this section, the expected relationship is borne out in the data; Exhibit 4.1 in Chapter 4 shows that LEP exiters have higher teacher ratings of English proficiency than non-exiters in every year.

In sum, all the measures we examined showed the expected relationship with teacher ratings of English proficiency. The correlation with reading test scores is weak, but the association with other variables is strong. Based in part on this evidence, we believe teacher ratings to be more than adequate for addressing questions in this report such as, "Are students with lower levels of English proficiency more likely to receive language-related services?" and "Do students who exit LEP status have higher levels of English proficiency than students who remain LEP?" However, because of the possibility of bias due to measurement error, we are less confident that teacher judgements provide accurate estimates of the percentage of LEP students at different levels of English proficiency.

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[5] Parents' and childrens' language proficiency might be correlated because of similar environmental influences (e.g., same length of time in the U.S.), or more directly (i.e., parents' proficiency might positively or negatively influence childrens' proficiency).